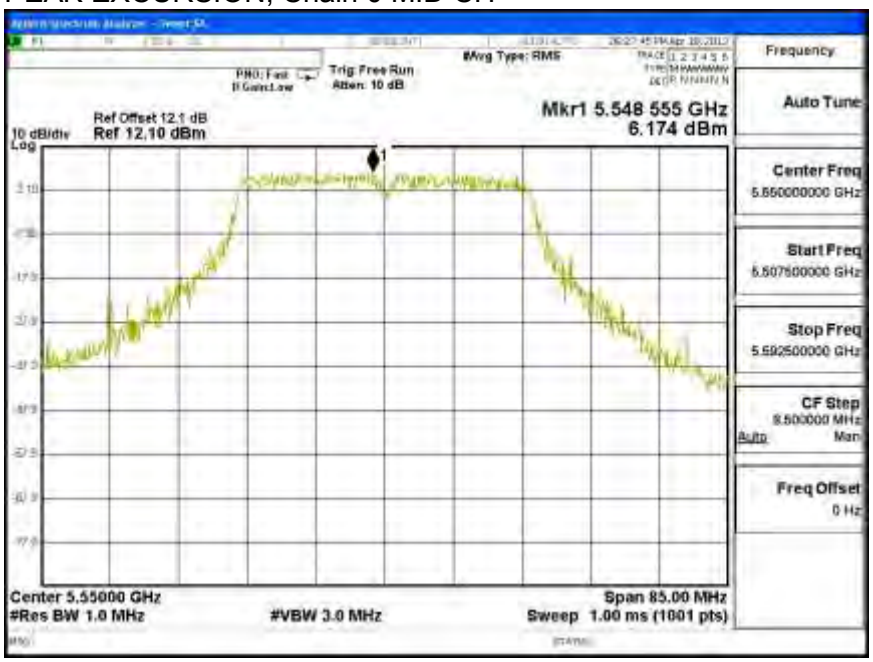
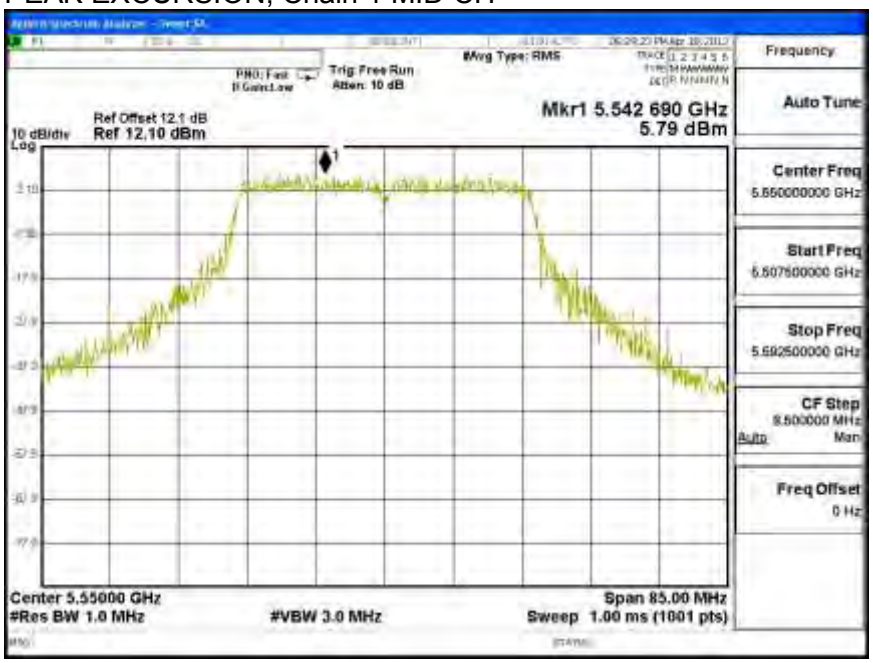
PEAK EXCURSION, Chain 0

PEAK EXCURSION, Chain 0 MID CH



PEAK EXCURSION, Chain 1

PEAK EXCURSION, Chain 1 MID CH



9.6.5. CONDUCTED WEATHER RADAR BAND EMISSIONS

LIMITS

Within 5600 – 5650 MHz band, -20 dBc relative to highest fundamental output power density per 100 kHz.

TEST PROCEDURE

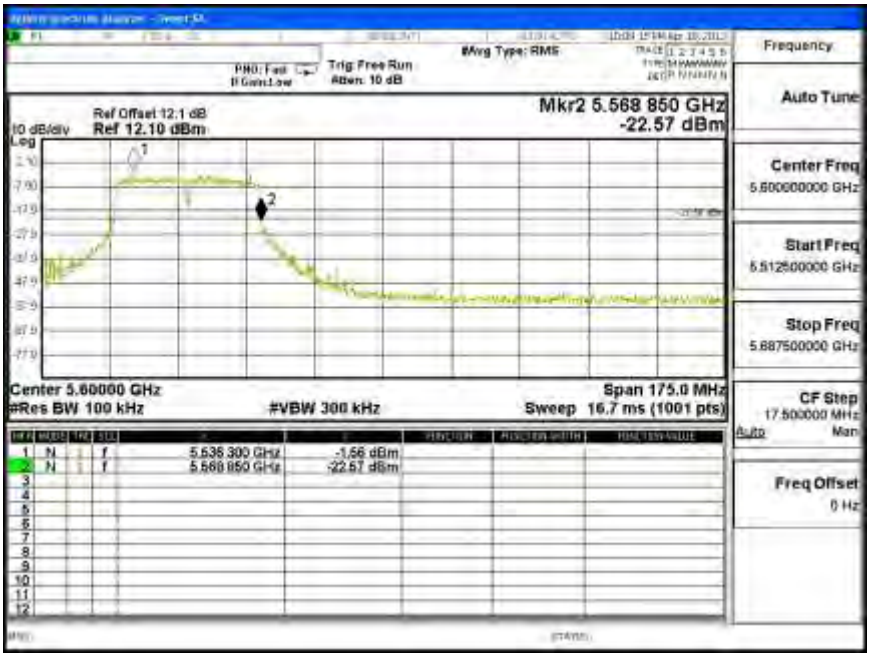
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The authorized channel nearest to and less than 5600 MHz is measured.

The authorized channel nearest to and greater than 5650 MHz is measured.

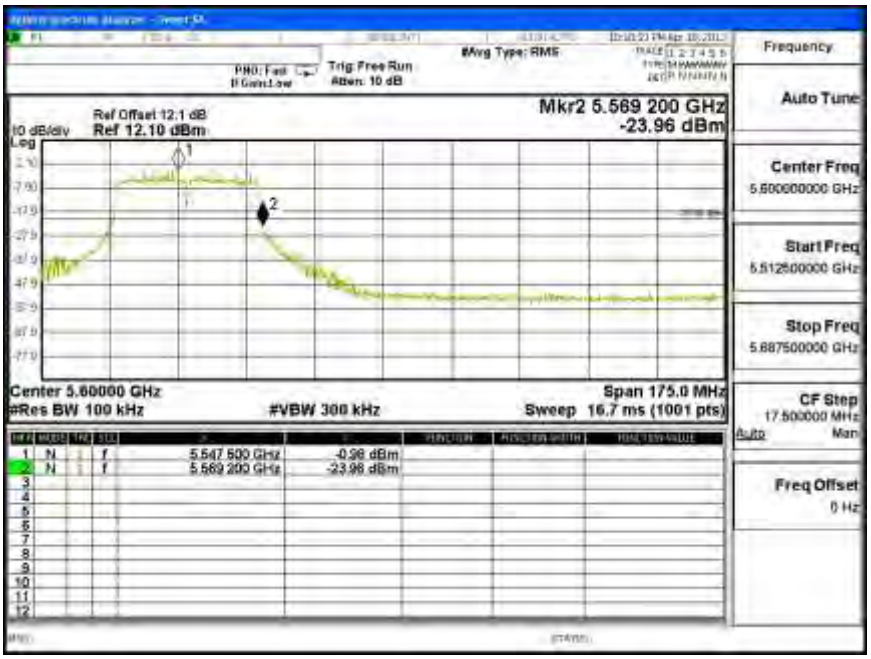
SPURIOUS EMISSIONS IN WEATHER RADAR BAND 5600 - 5650 MHz

LOWER CHANNEL CHAIN 0 SPURIOUS



UPPER CHANNEL CHAIN 0 SPURIOUS

LOWER CHANNEL CHAIN 1 SPURIOUS



UPPER CHANNEL CHAIN 1 SPURIOUS

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

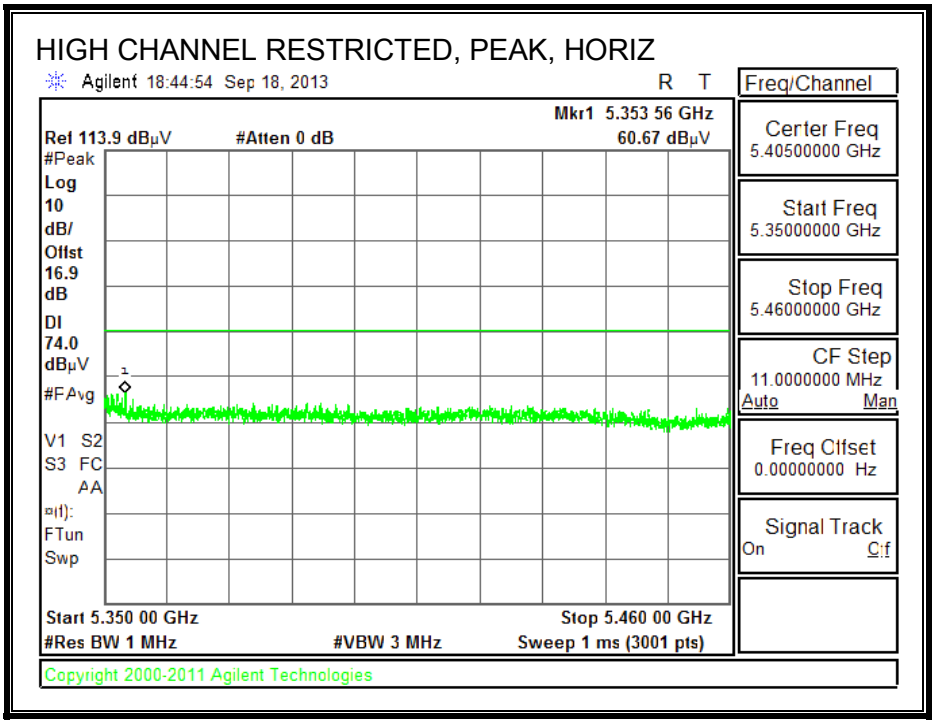
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

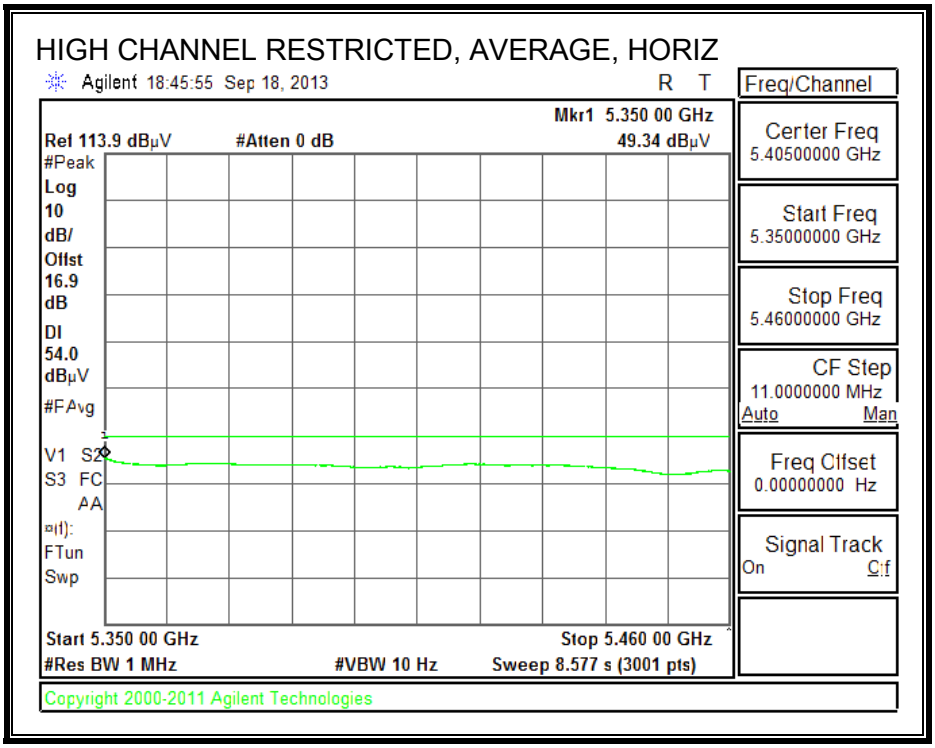
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

10.2. DIPOLE ANTENNA

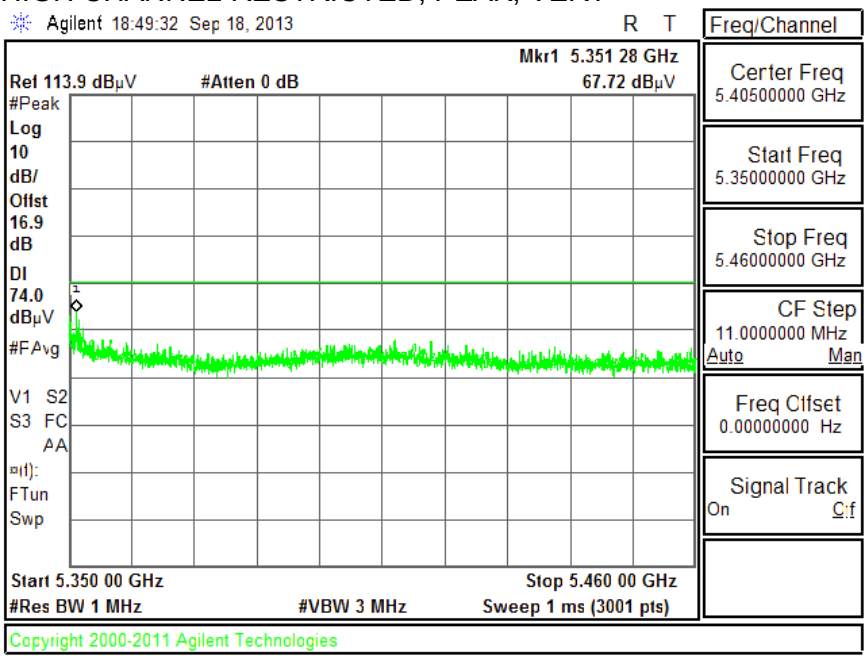
10.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

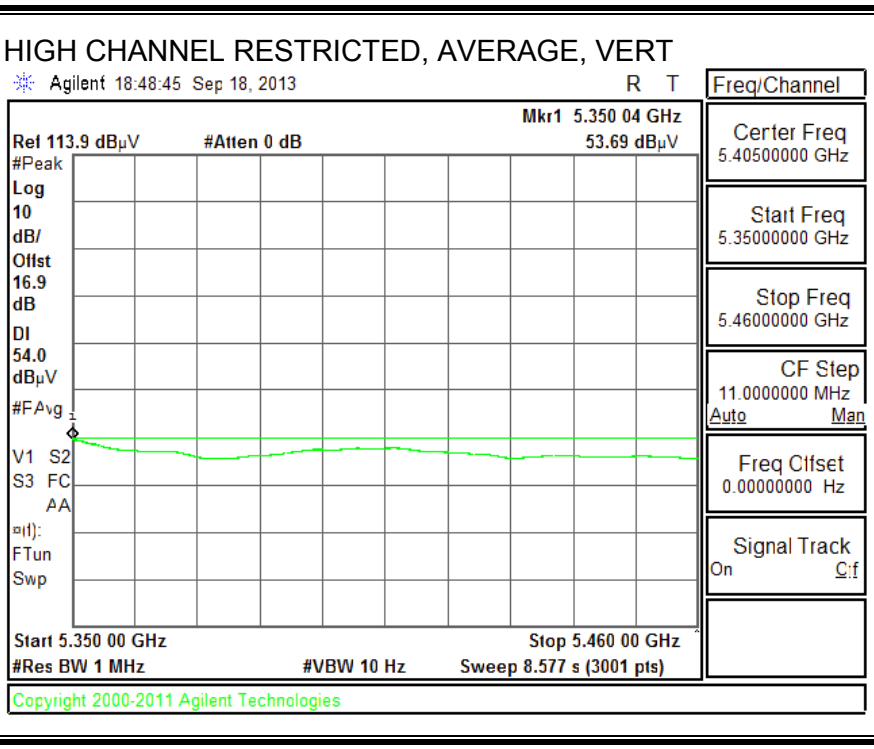




HIGH CHANNEL RESTRICTED, PEAK, VERT

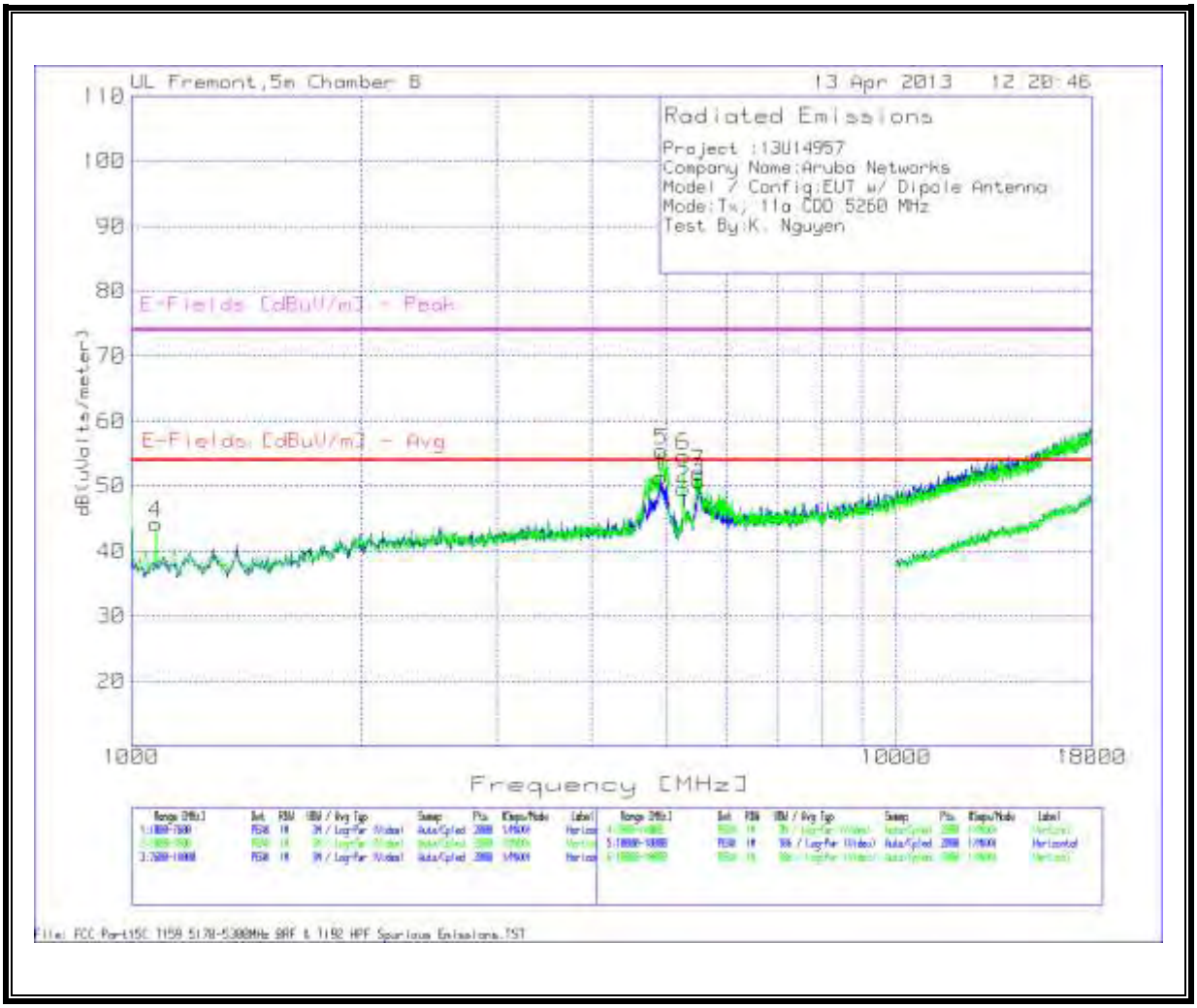


HIGH CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode: Tx; 11a CDD 5260 MHz
Test By:K. Nguyen

Horizontal

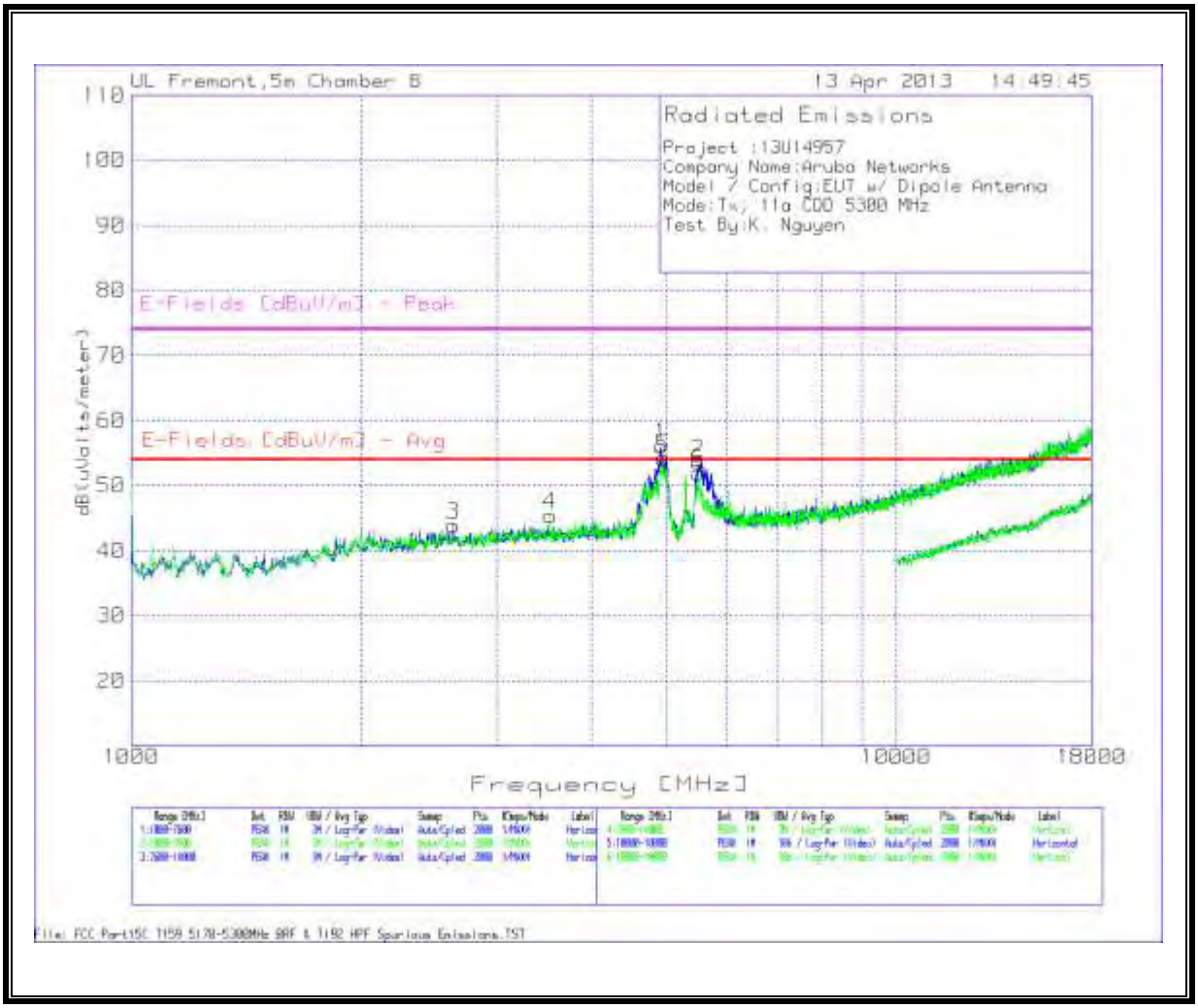
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1	4921.739	44.28	PK	34.6	-34.9	7.1	0.3	51.38	-	-	74	-22.62	Horz
1a	4921.739	40.72	VB1	34.6	-34.9	7.1	0.3	47.82	54	-6.18	-	-	Horz
2*	5522.039	42.57	PK	34.9	-34.9	7.6	0.7	50.87	-	-	68.2	-17.33	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3**	1079.16	49.13	PK	27.8	-35.9	3.2	0	44.23	54	-9.77	74	-29.77	Vert
4	4934.933	48.28	PK	34.6	-34.9	7.2	0.2	55.38	-	-	74	-18.62	Vert
4a	4934.933	36.38	VB1	34.6	-34.9	7.1	0.3	43.48	54	-10.52	-	-	Vert
6*	5264.768	46.35	PK	34.9	-34.9	7.4	0.9	54.65	-	-	68.2	-13.55	Vert
5*	5508.846	43.62	PK	34.9	-34.9	7.6	0.8	52.02	-	-	68.2	-16.18	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV/ (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode: Tx; 11a CDD 5300 MHz
Test By:K. Nguyen

Horizontal

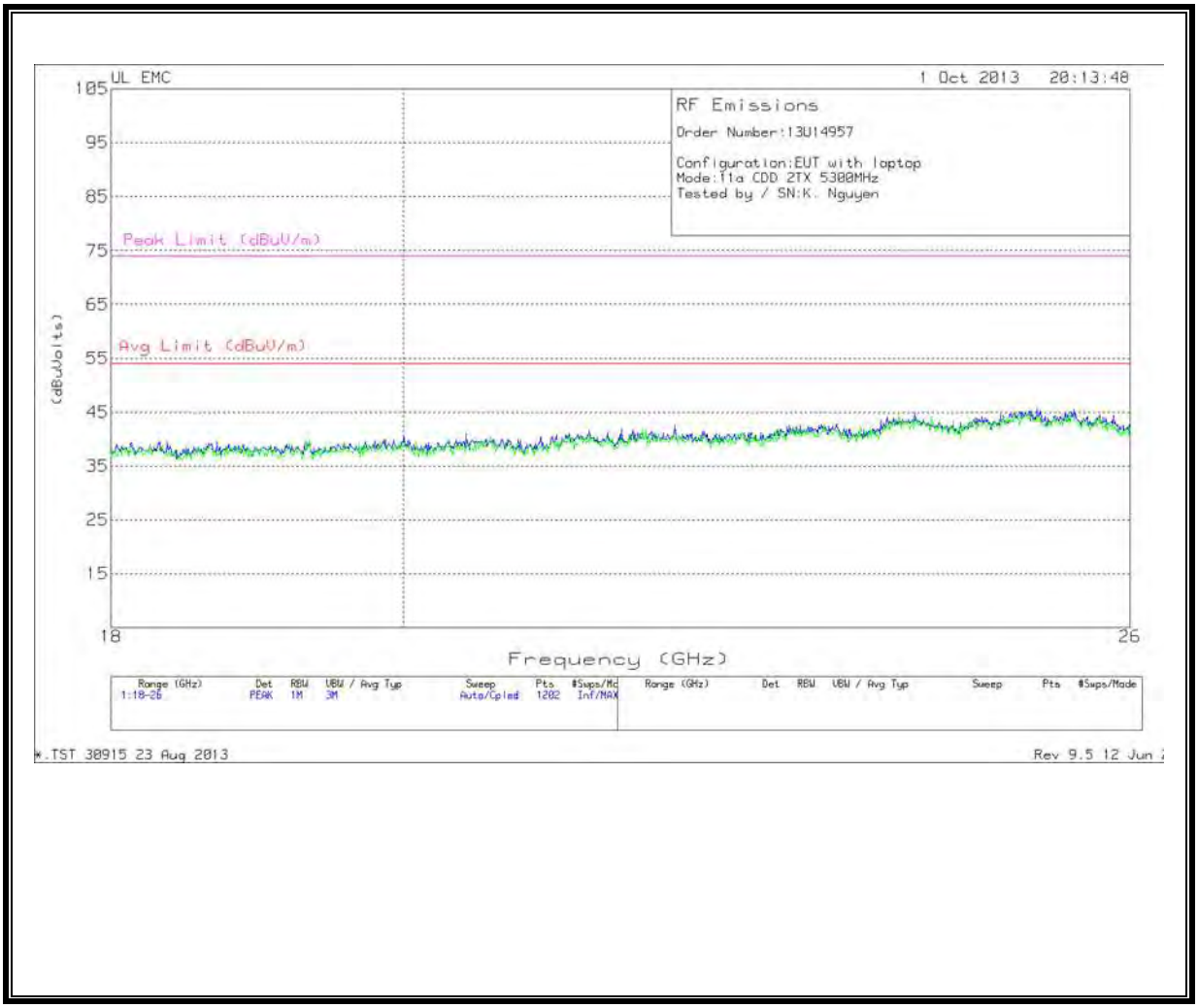
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3*	2635.982	41.35	PK	32.7	-35.1	4.9	0.1	43.95	-	-	68.2	-24.25	Horz
1	4928.336	49.06	PK	34.6	-34.9	7.1	0.2	56.06	-	-	74	-17.94	Horz
1a	4928.336	45.44	VB1	34.6	-34.9	7.1	0.2	52.44	54	-1.56	-	-	Horz
2*	5512.144	45.21	PK	34.9	-34.9	7.6	0.8	53.61	-	-	68.2	-14.59	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
4*	3533.133	41.35	PK	33.3	-35	5.8	0	45.45	-	-	68.2	-22.75	Vert
5	4964.618	47.01	PK	34.6	-34.9	7.2	0.3	54.21	-	-	74	-19.79	Vert
5a	4964.618	34.78	VB1	34.6	-34.9	7.1	0.3	41.88	54	-12.12	-	-	Vert
6*	5515.442	43.66	PK	34.9	-34.9	7.6	0.7	51.96	-	-	68.2	-16.24	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

18-26GHz

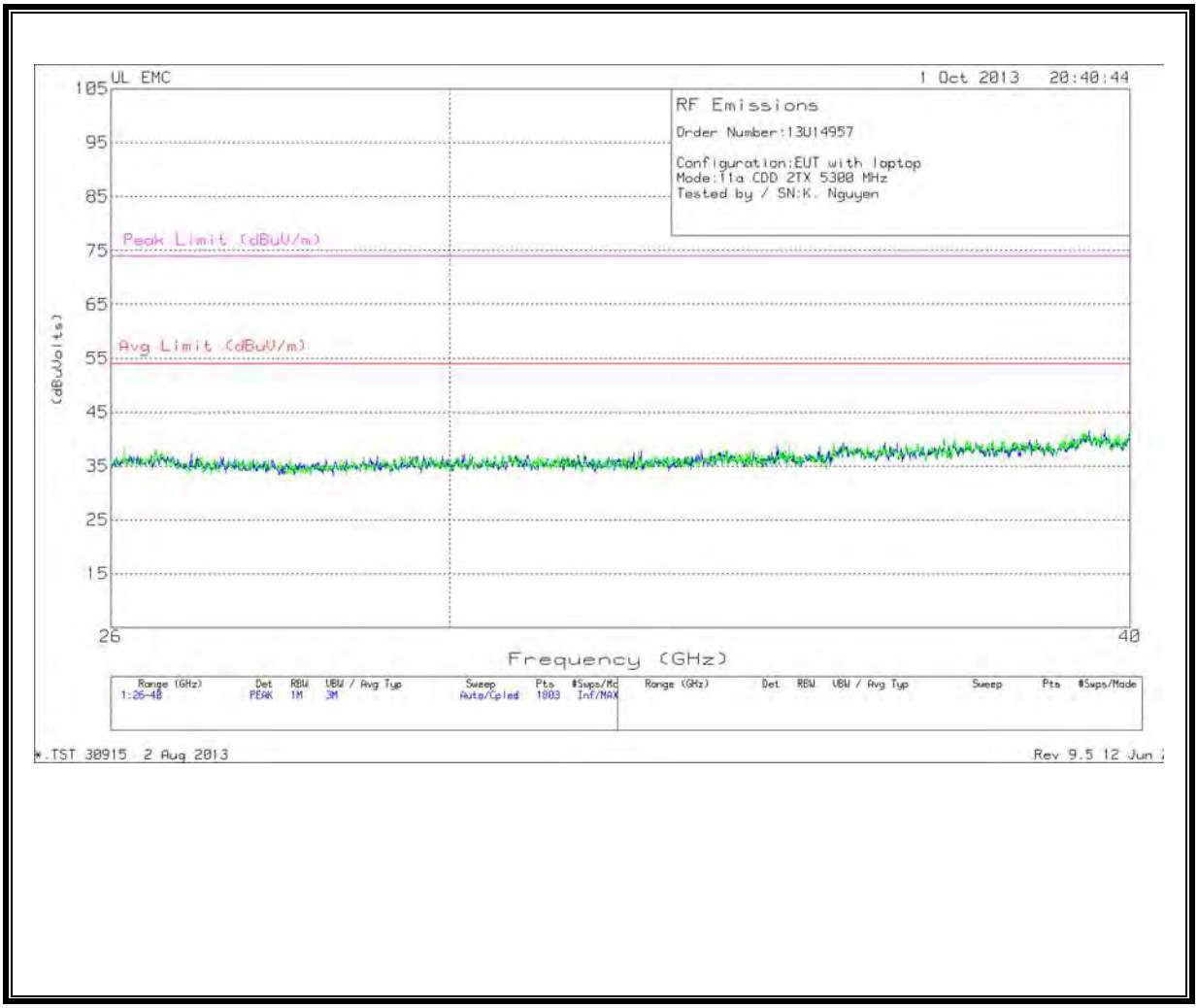


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Avg Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.319	40.23	PK	32.4	-23.8	-9.5	39.33	54	-14.67	74	-34.67
2	25.087	43.73	PK	34	-22.9	-9.5	45.33	54	-8.67	74	-28.67
3	19.339	41	PK	32.4	-23.9	-9.5	40	54	-14	74	-34
4	23.915	43.47	PK	33.4	-22.7	-9.5	44.67	54	-9.33	74	-29.33

PK - Peak detector

26-40GHz

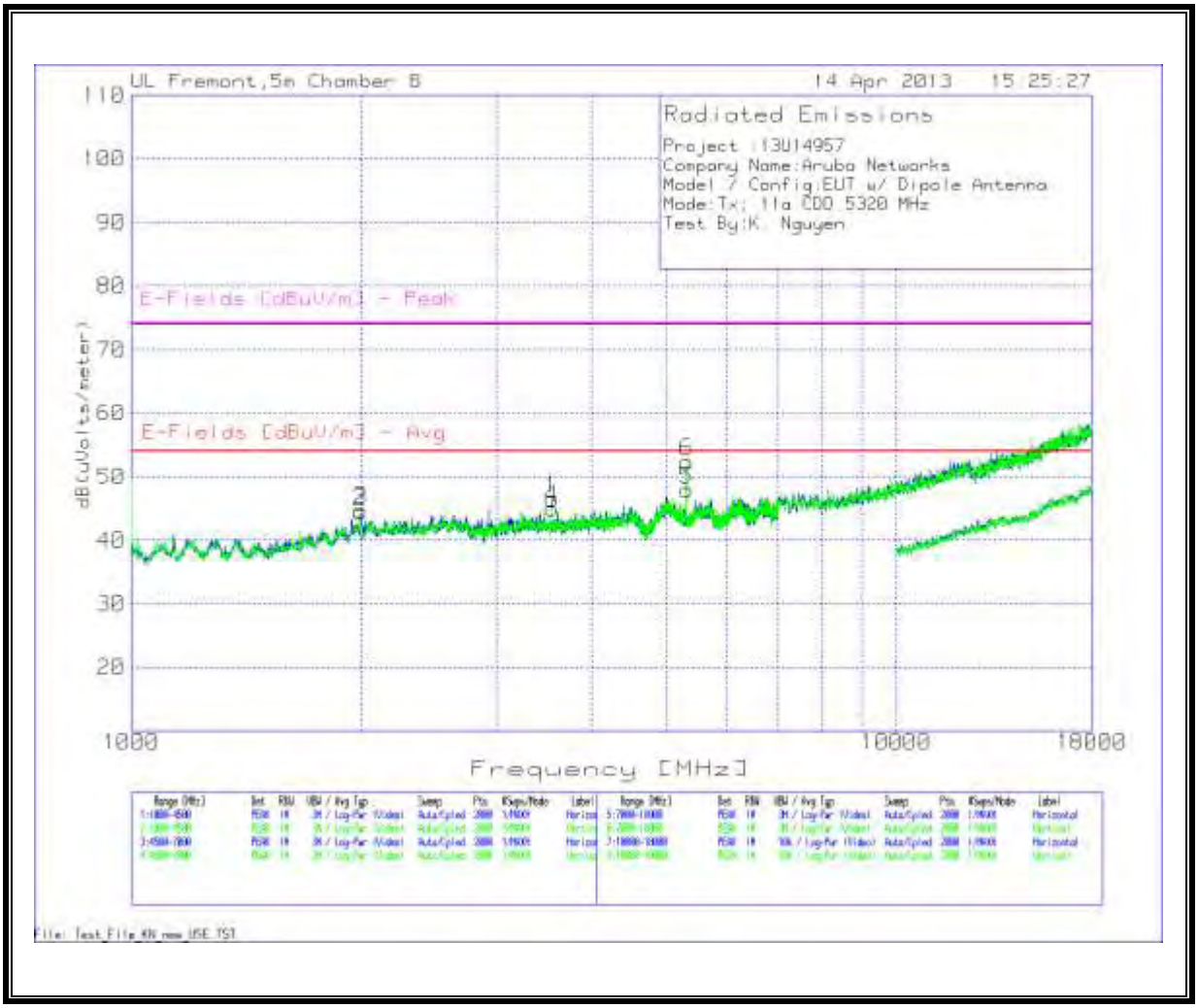


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Avg Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	34.461	48.23	PK	37.4	-37.3	-9.5	38.83	54	-15.17	74	-35.17
2	39.316	49.1	PK	38.3	-36.4	-9.5	41.5	54	-12.5	74	-32.5
3	34.632	48.7	PK	37.3	-37.5	-9.5	39	54	-15	74	-35
4	38.92	50.03	PK	37	-36.7	-9.5	40.83	54	-13.17	74	-33.17

PK - Peak detector

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode: Tx; 11a CDD 5320 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	3546.727	42.4	PK	33.3	-35	5.8	0	46.5	-	-	68.2	-21.7	Horz
2*	1993.503	43.5	PK	31.8	-35	4.2	0	44.5	-	-	68.2	-23.7	Horz

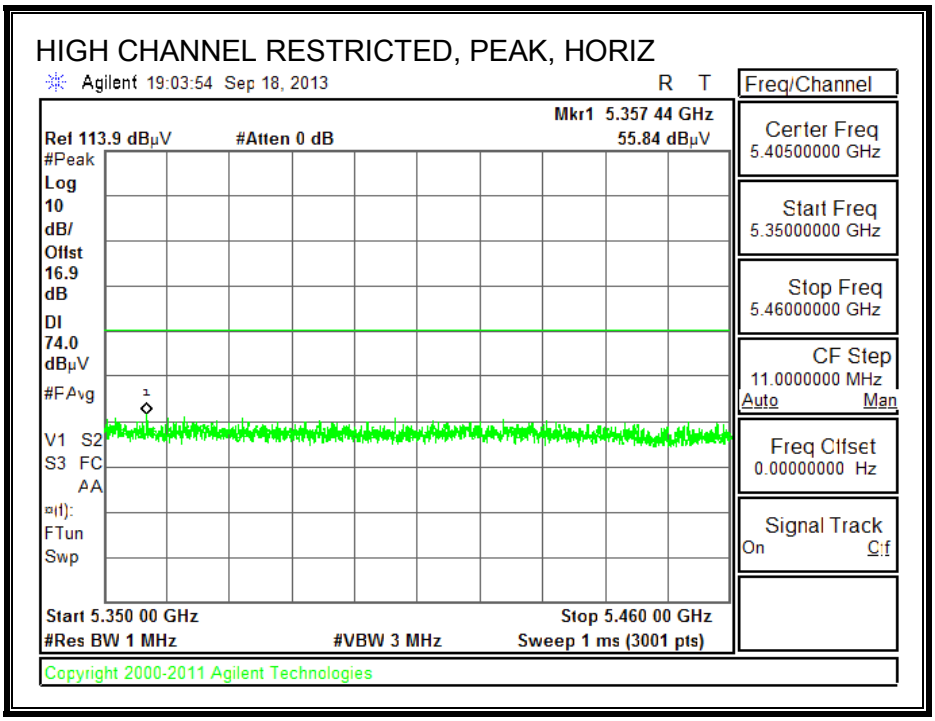
Vertical

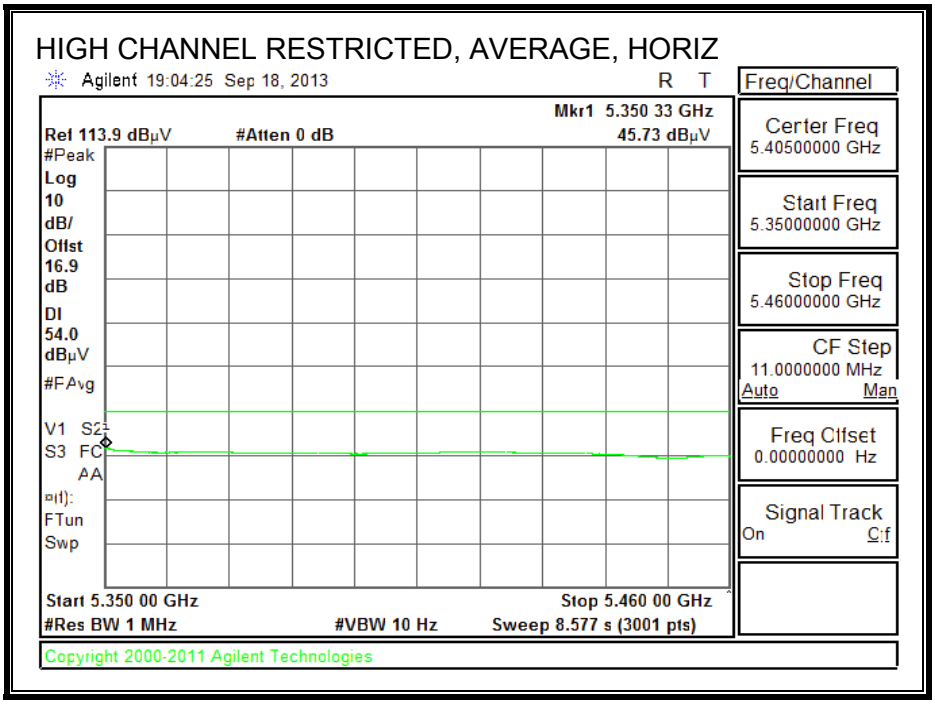
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3*	1995.252	43.71	PK	31.8	-35	4.2	0	44.71	-	-	68.2	-23.49	Vert
4*	3546.727	40.87	PK	33.3	-35	5.8	0	44.97	-	-	68.2	-23.23	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

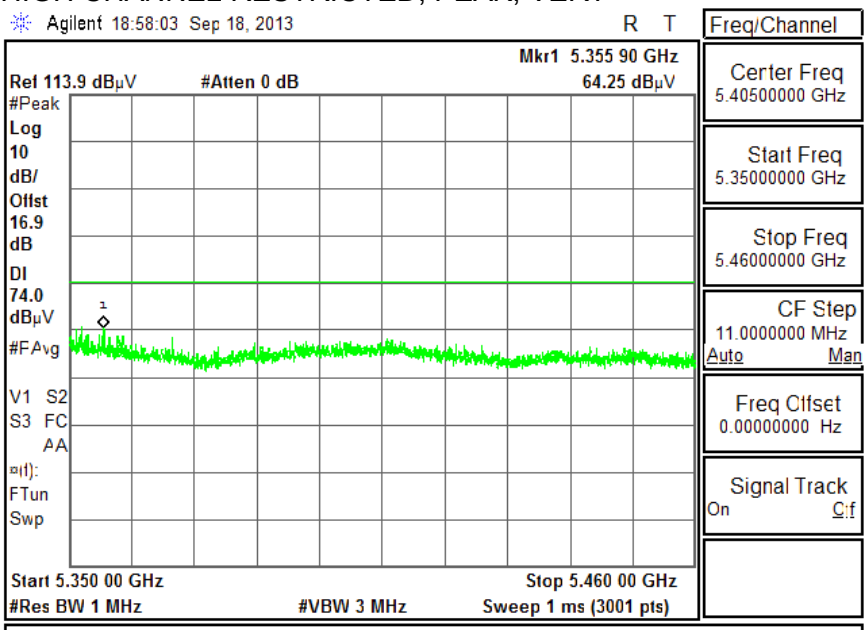
10.2.2. TX ABOVE 1 GHz 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

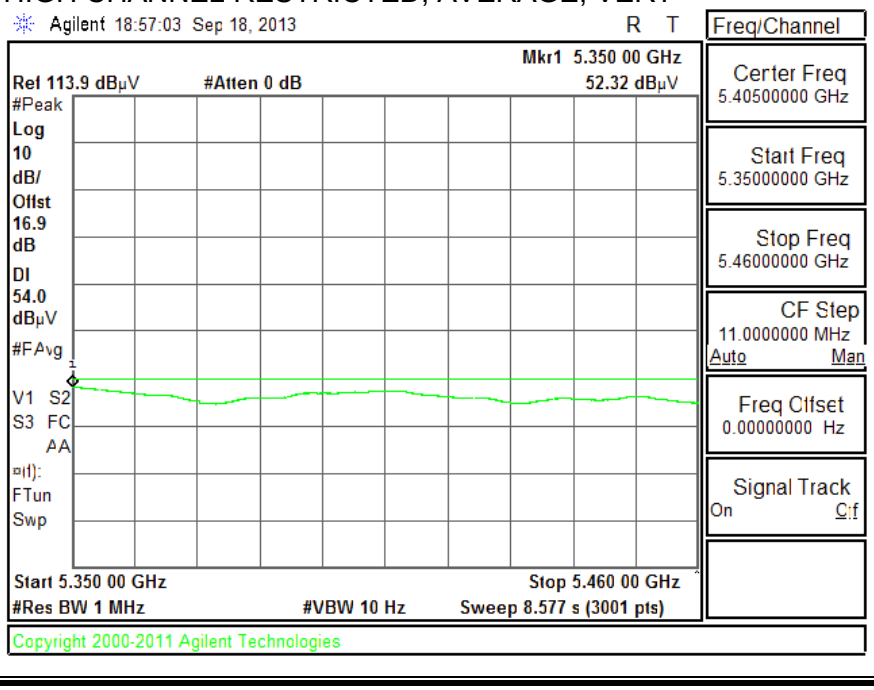




HIGH CHANNEL RESTRICTED, PEAK, VERT

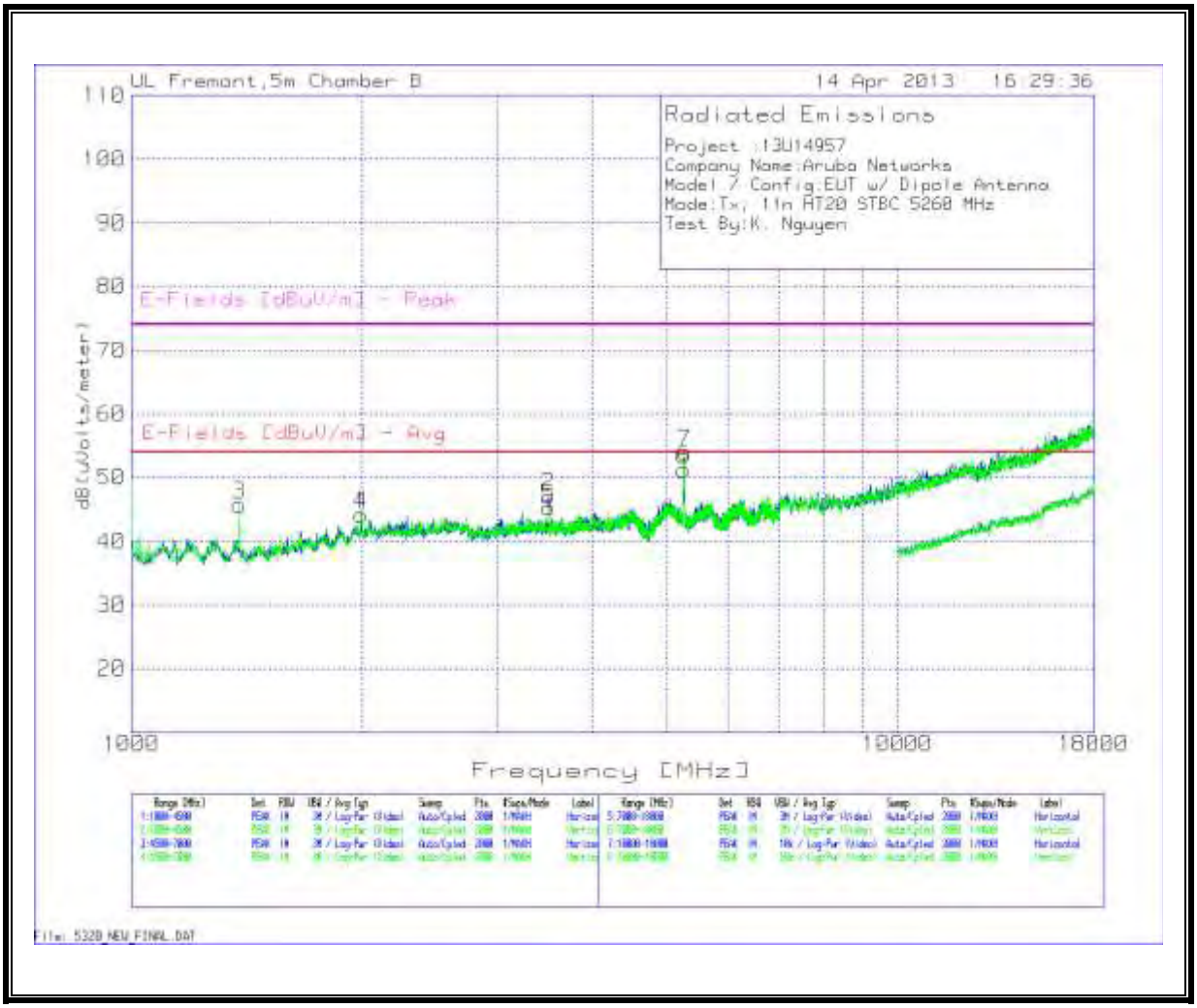


HIGH CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode: Tx; 11n HT20 STBC 5260 MHz
Test By:K. Nguyen

Horizontal

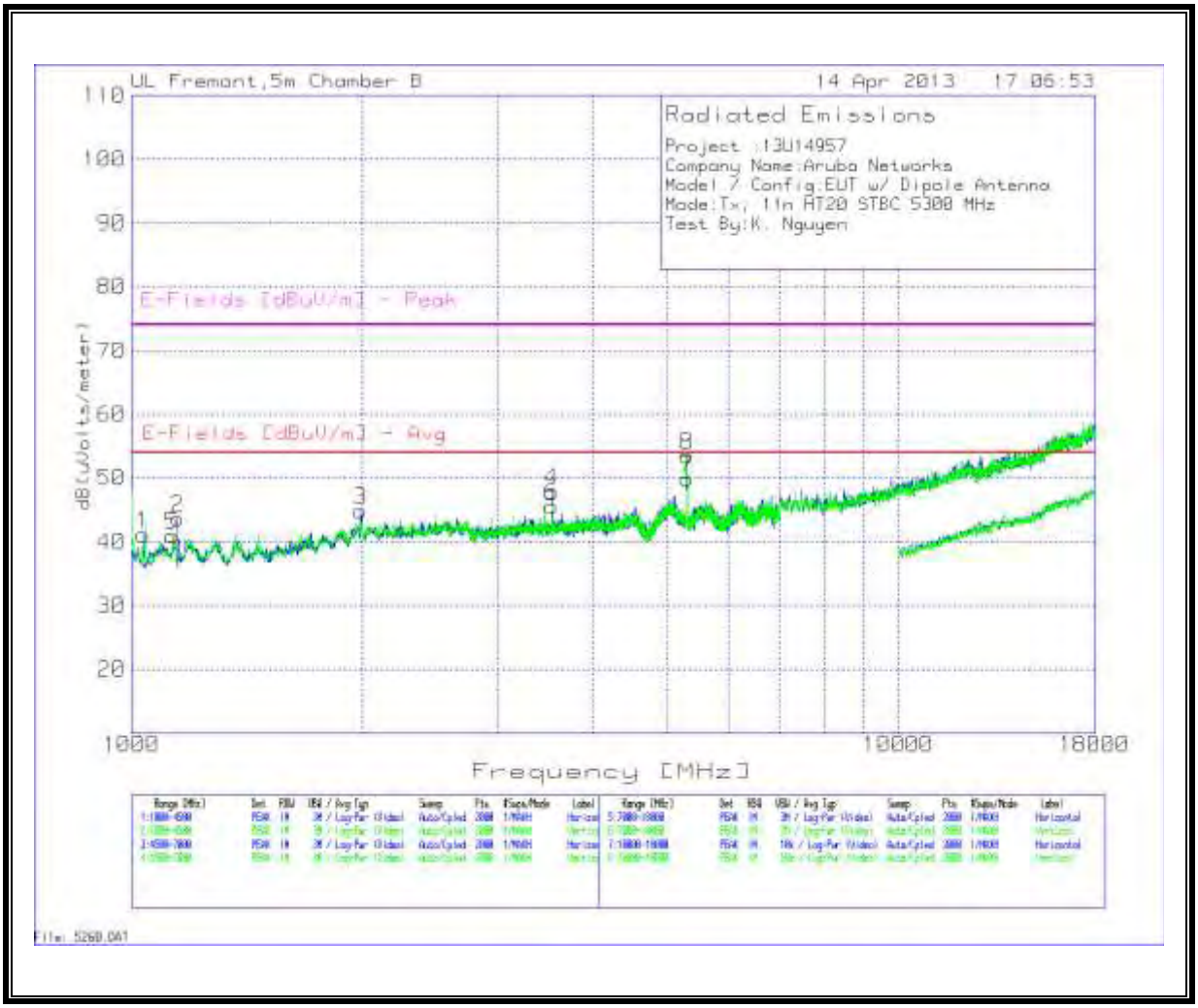
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1993.503	43.24	PK	31.8	-35	4.2	0	44.24	-	-	68.2	-23.96	Horz
2*	3506.497	43.12	PK	33.2	-35	5.8	0	47.12	-	-	68.2	-21.08	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3**	1383.058	49.13	PK	28.4	-35.4	3.6	0	45.73	54	-8.27	74	-28.27	Vert
4*	1993.503	43.16	PK	31.8	-35	4.2	0	44.16	-	-	68.2	-24.04	Vert
5*	3506.497	41.3	PK	33.2	-35	5.8	0	45.3	-	-	68.2	-22.9	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode: Tx; 11n HT20 STBC 5300 MHz
Test By:K. Nguyen

Horizontal

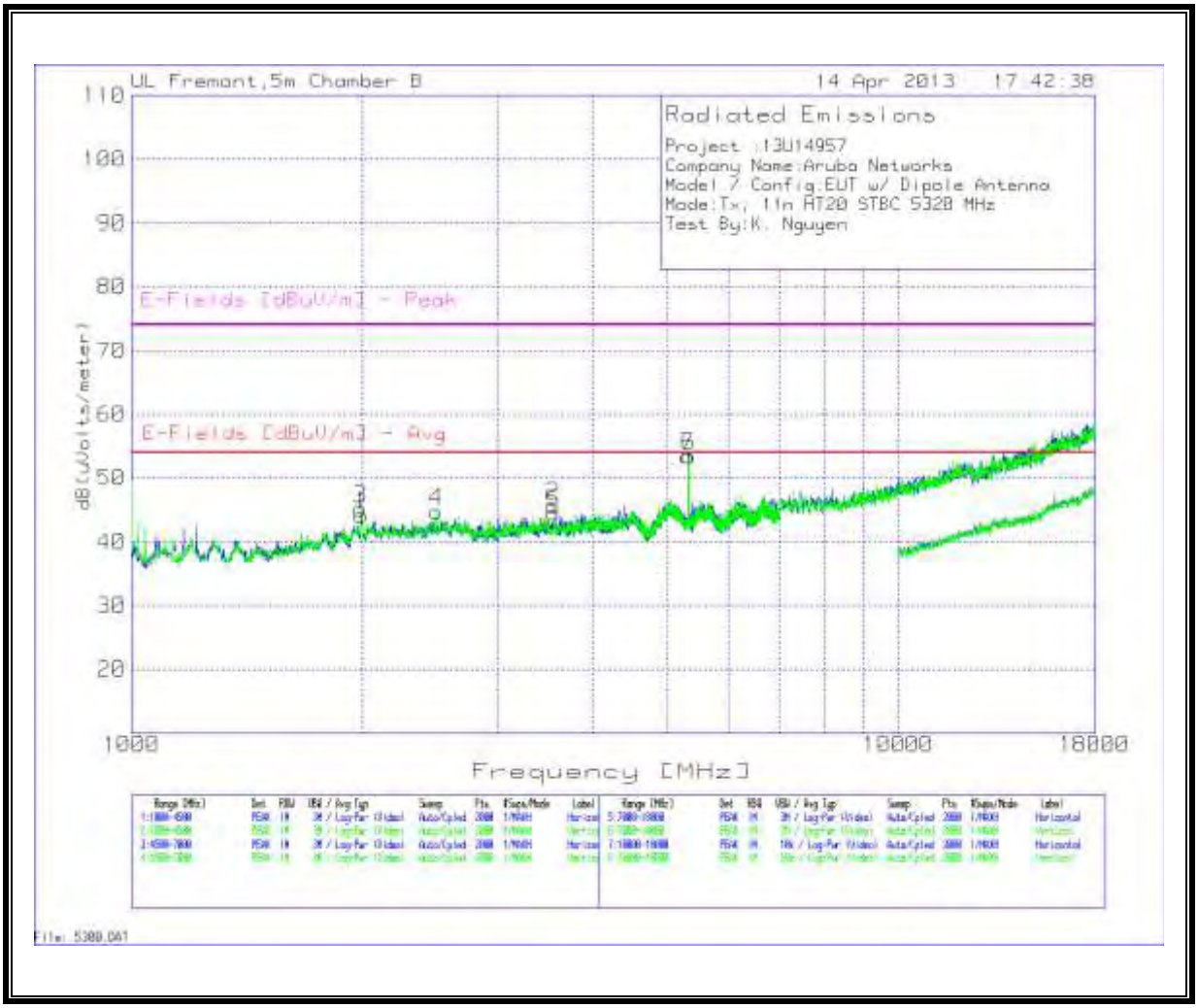
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1**	1036.732	46.2	PK	27.6	-35.9	3.2	0	41.1	54	-12.9	74	-32.9	Horz
2**	1150.425	48.01	PK	28.1	-35.8	3.3	0	43.61	54	-10.39	74	-30.39	Horz
3*	1991.754	44.03	PK	31.7	-35	4.2	0	44.93	-	-	68.2	-23.27	Horz
4*	3534.483	43.85	PK	33.3	-35	5.8	0	47.95	-	-	68.2	-20.25	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
5**	1131.184	45.52	PK	28	-35.8	3.3	0	41.02	54	-12.98	74	-32.98	Vert
6*	3534.483	41.41	PK	33.3	-35	5.8	0	45.51	-	-	68.2	-22.69	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode: Tx; 11n HT20 STBC 5320 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1993.503	43.2	PK	31.8	-35	4.2	0	44.2	-	-	68.2	-24	Horz
2*	3546.727	41.65	PK	33.3	-35	5.8	0	45.75	-	-	68.2	-22.45	Horz

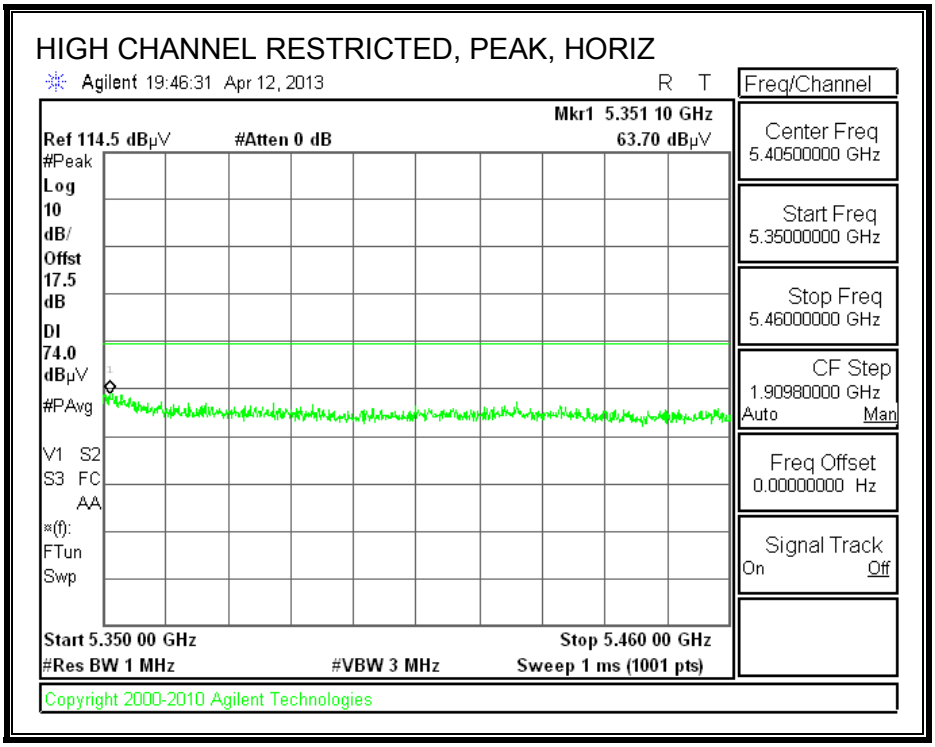
Vertical

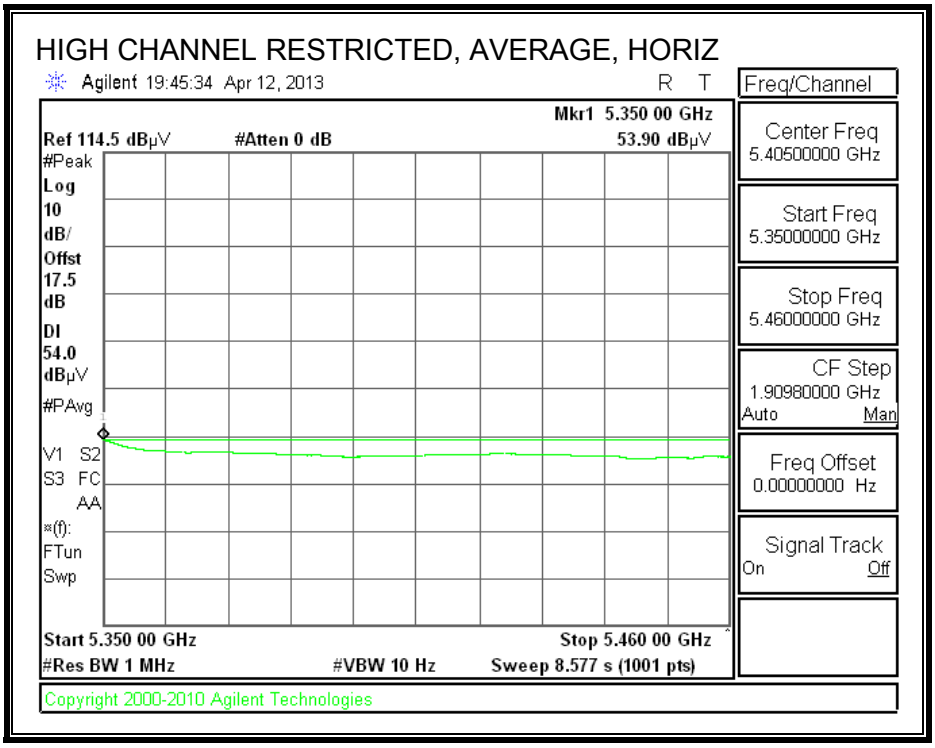
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3*	1991.754	44.21	PK	31.7	-35	4.2	0	45.11	-	-	68.2	-23.09	Vert
4**	2497.251	42.48	PK	32.5	-35	4.7	0.1	44.78	54	-9.22	74	-29.22	Vert
5*	3546.727	40.44	PK	33.3	-35	5.8	0	44.54	-	-	68.2	-23.66	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

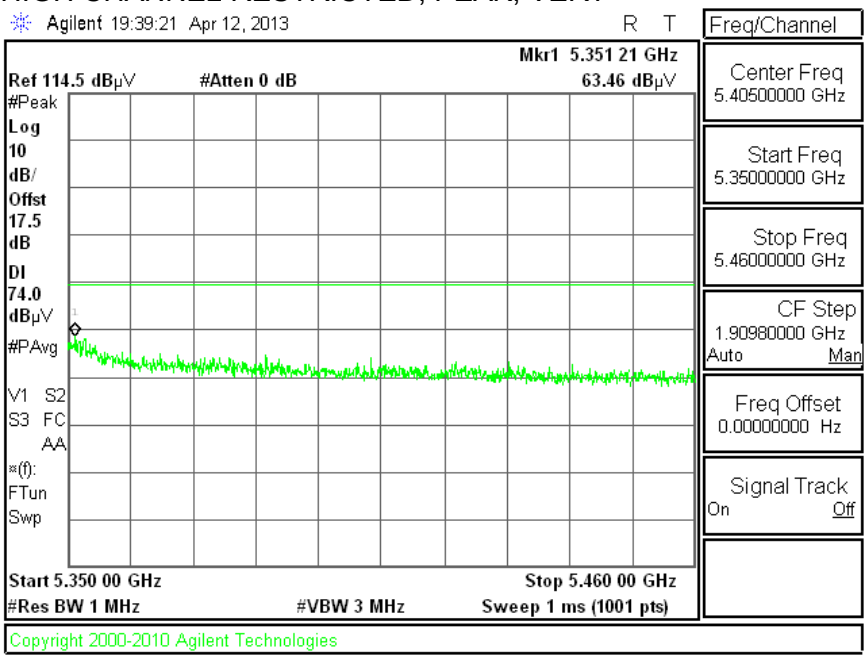
10.2.3. TX ABOVE 1 GHz 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

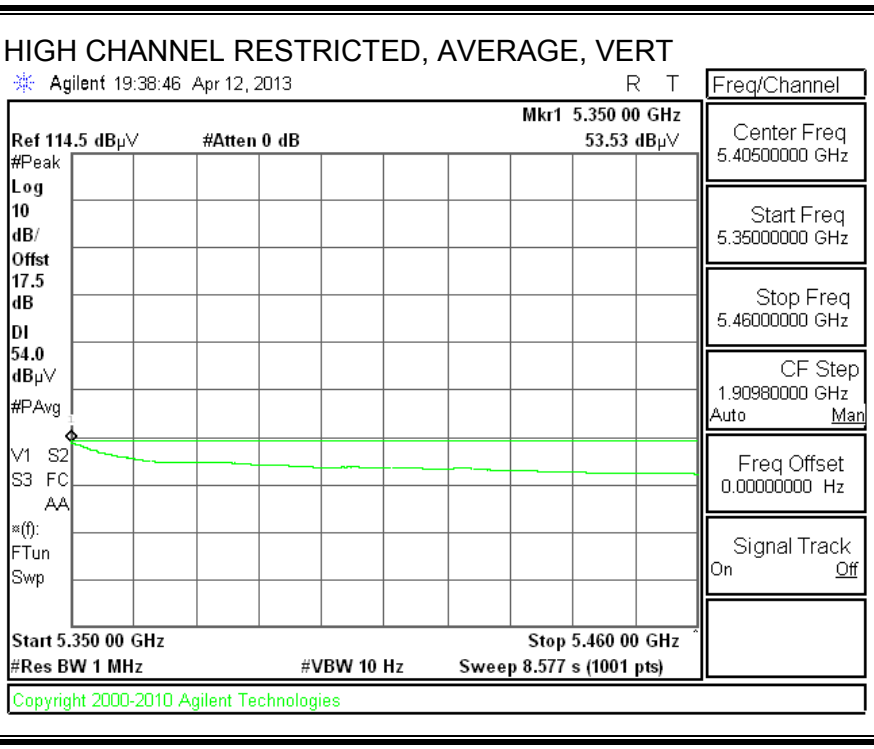




HIGH CHANNEL RESTRICTED, PEAK, VERT

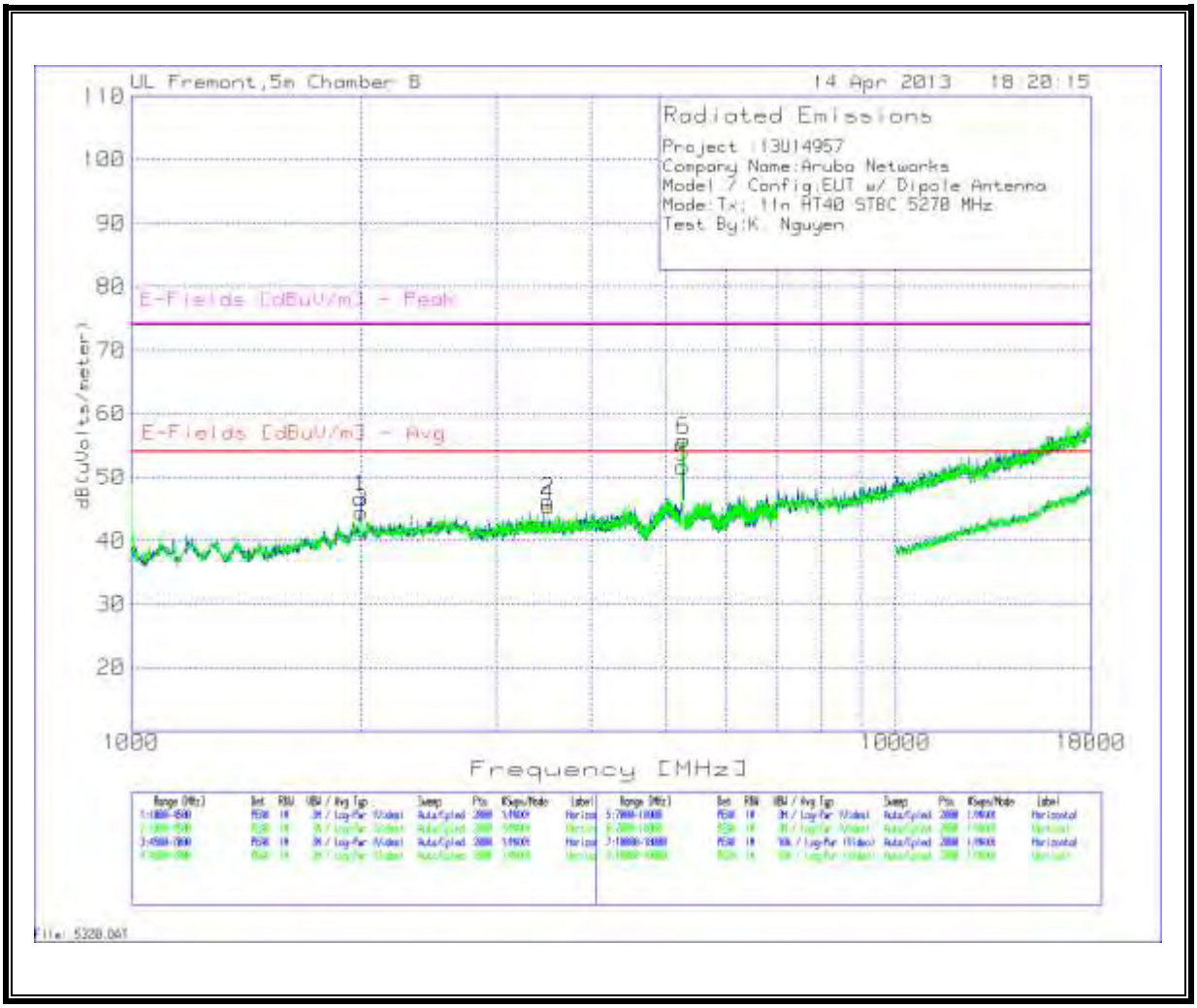


HIGH CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11n HT40 STBC 5270 MHz
Test By:K. Nguyen

Horizontal

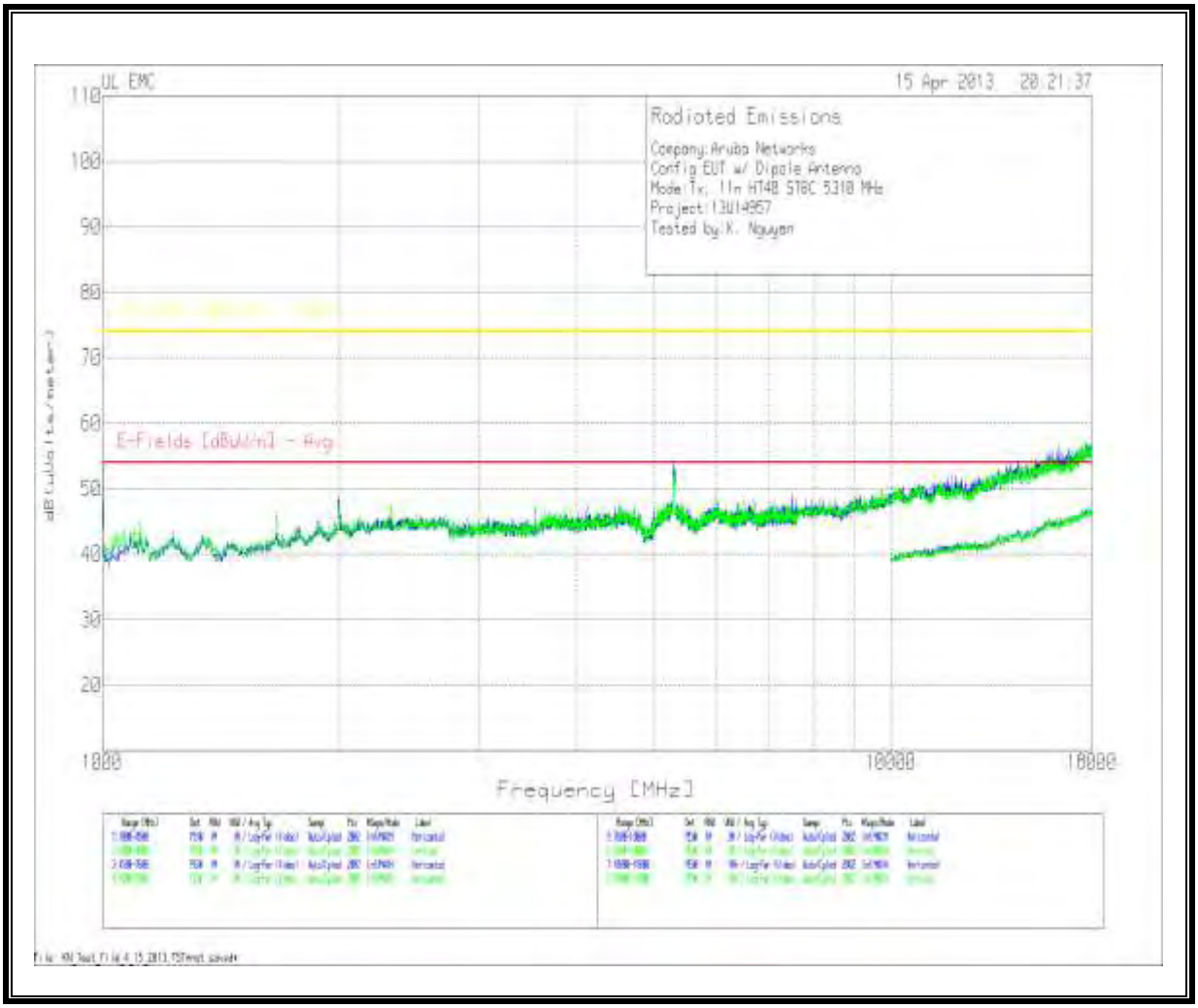
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1993.503	45.69	PK	31.8	-35	4.2	0	46.69	-	-	68.2	-21.51	Horz
2*	3513.493	42.32	PK	33.2	-35	5.8	0	46.32	-	-	68.2	-21.88	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3*	1998.751	43.41	PK	31.8	-35	4.2	0	44.41	-	-	68.2	-23.79	Vert
4*	3513.493	41.37	PK	33.2	-35	5.8	0	45.37	-	-	68.2	-22.83	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11n HT40 STBC 5310 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1**	1661.169	43.1	PK	29.4	-34.8	5.6	0	43.3	54	-10.7	74	-30.7	Horz
2*	1991.754	44.95	PK	31.6	-34.7	5.8	0	47.65	-	-	68.2	-20.55	Horz
3**	2325.837	41.58	PK	32.4	-34.8	6.1	0.1	45.38	54	-8.62	74	-28.62	Horz

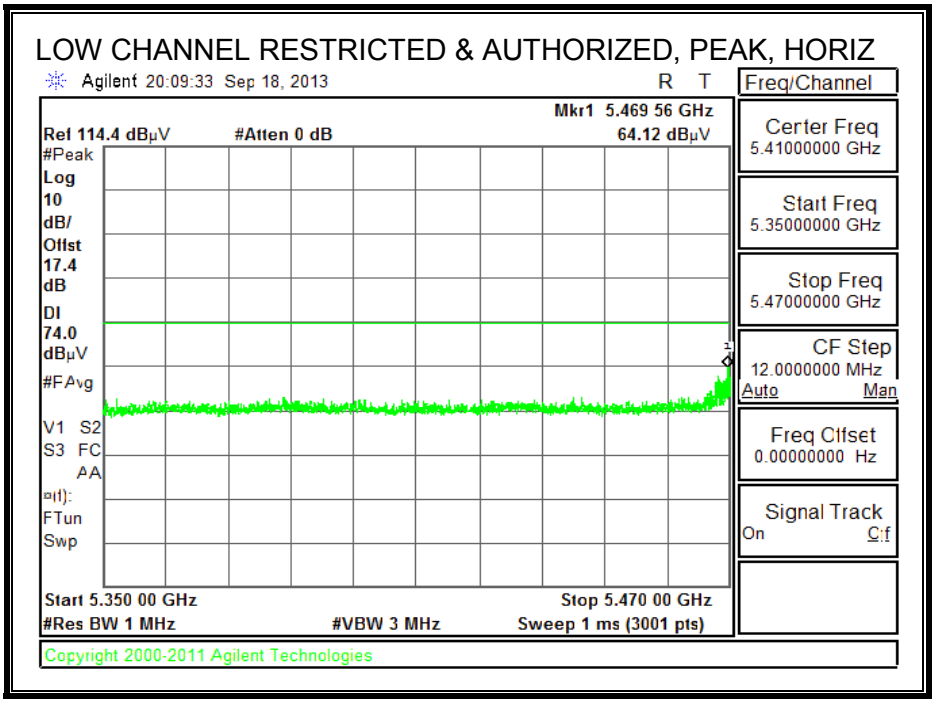
Vertical

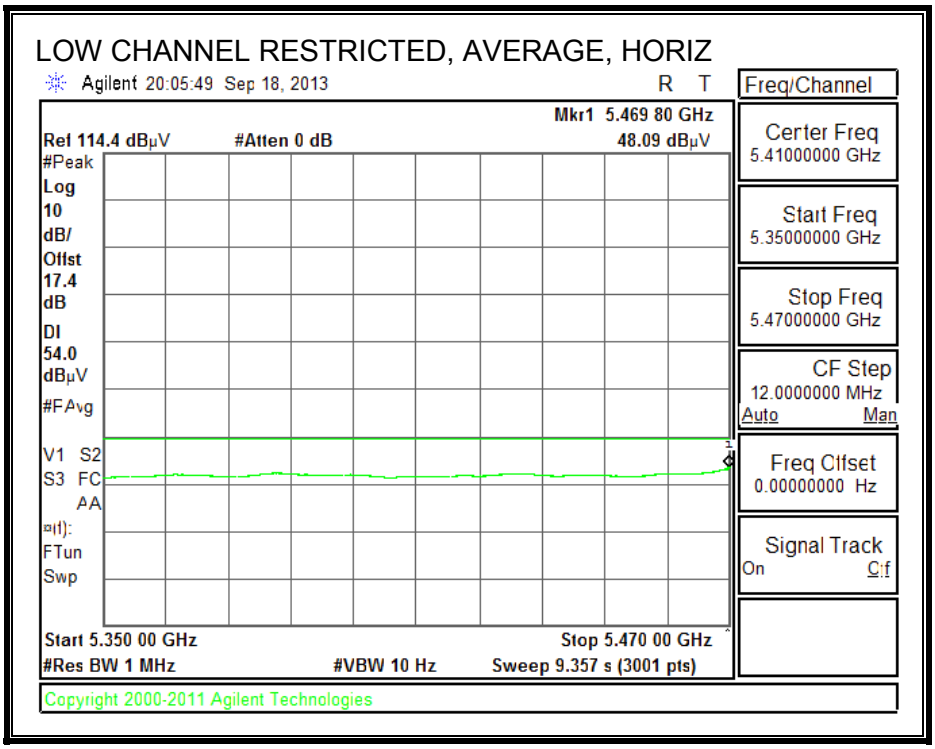
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
4**	1664.668	46.16	PK	29.4	-34.8	5.6	0	46.36	54	-7.64	74	-27.64	Vert
5*	1993.503	44.43	PK	31.7	-34.7	5.8	0	47.23	-	-	68.2	-20.97	Vert
6**	2325.837	43.87	PK	32.4	-34.8	6.1	0.1	47.67	54	-6.33	74	-26.33	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

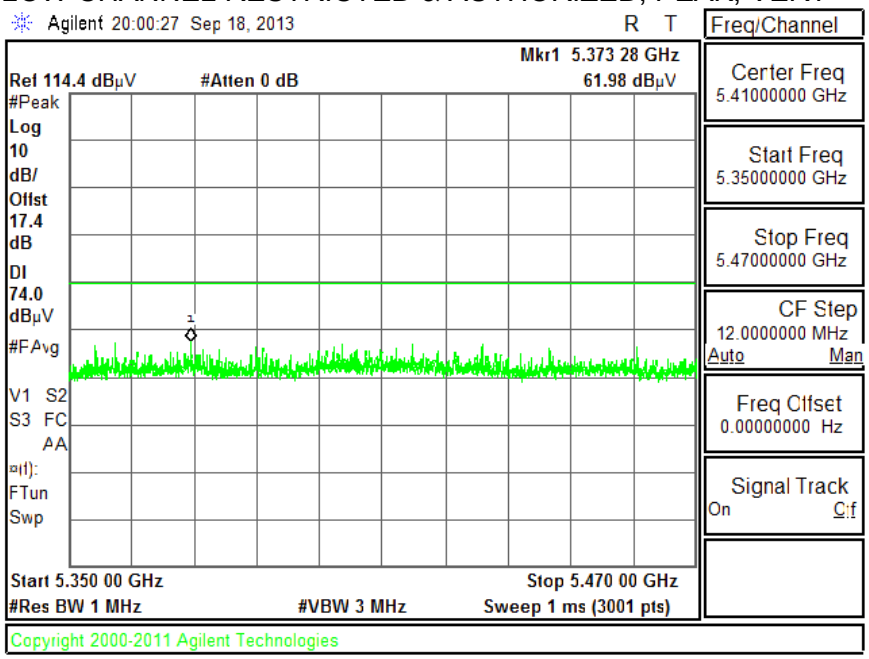
10.2.4. TX ABOVE 1 GHz 802.11a CDD MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)

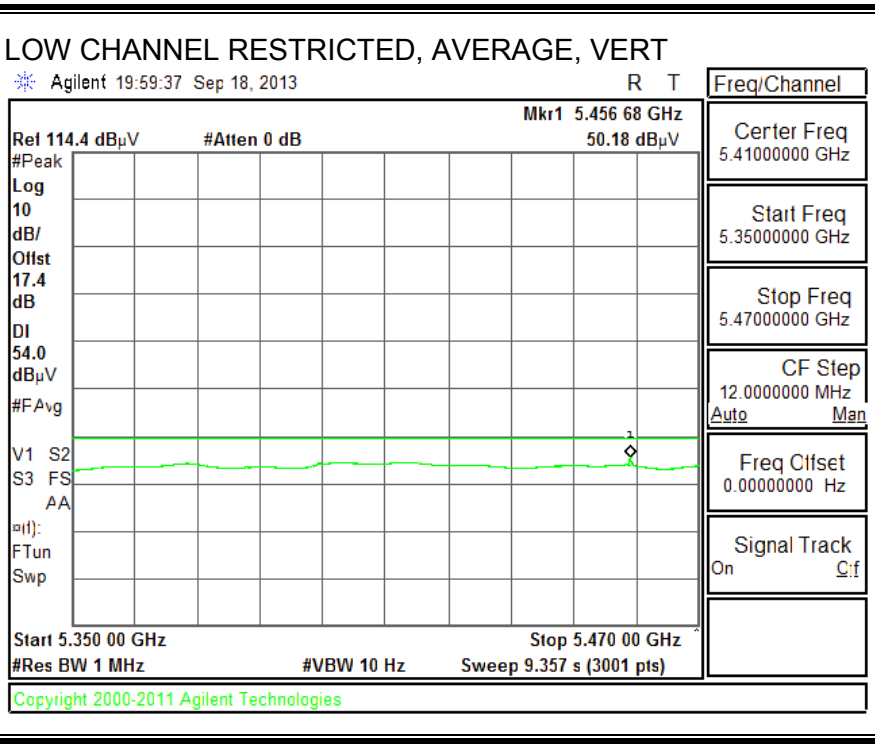




LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, VERT

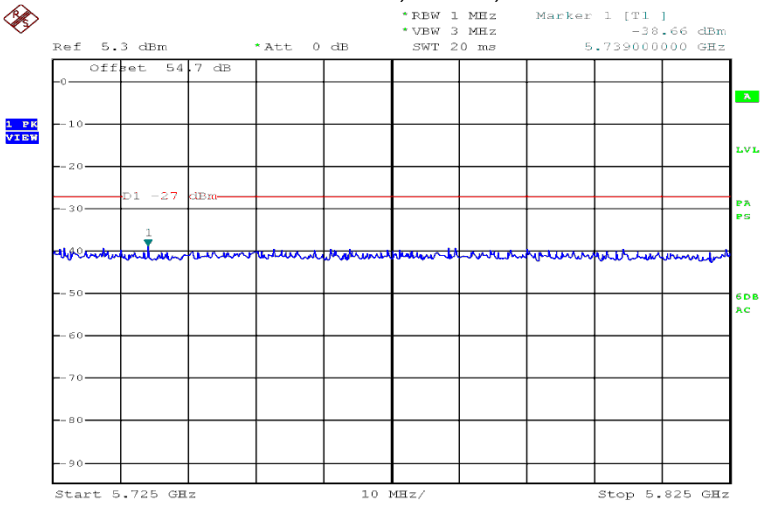


LOW CHANNEL RESTRICTED, AVERAGE, VERT

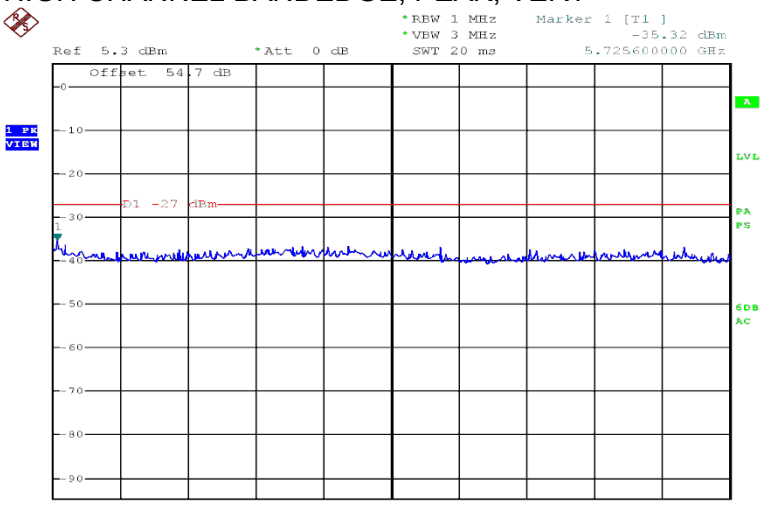


AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL BANDEDGE, PEAK, HORIZ

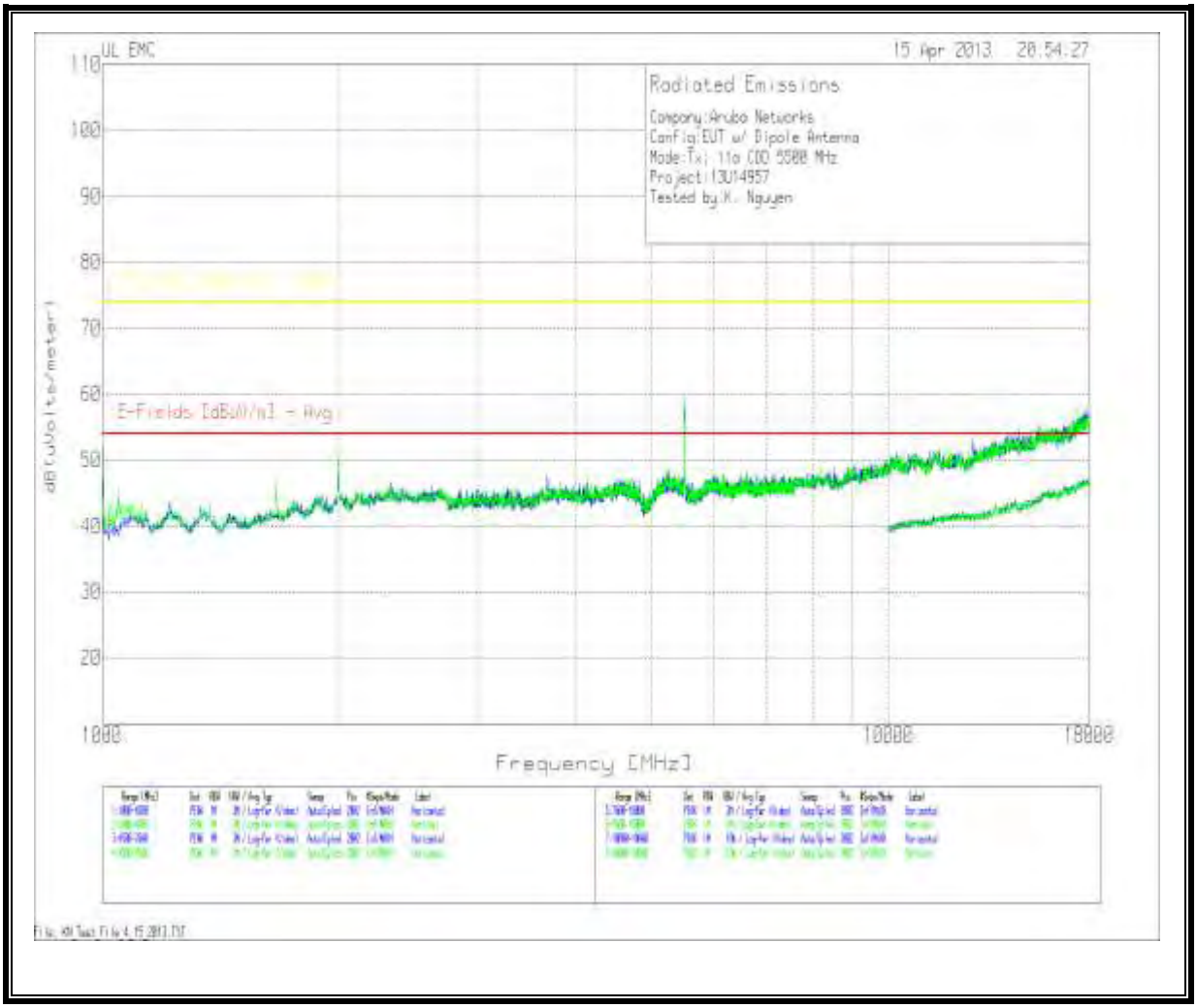


HIGH CHANNEL BANDEDGE, PEAK, VERT



HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11a CDD 5500 MHz
Test By:K. Nguyen

Horizontal

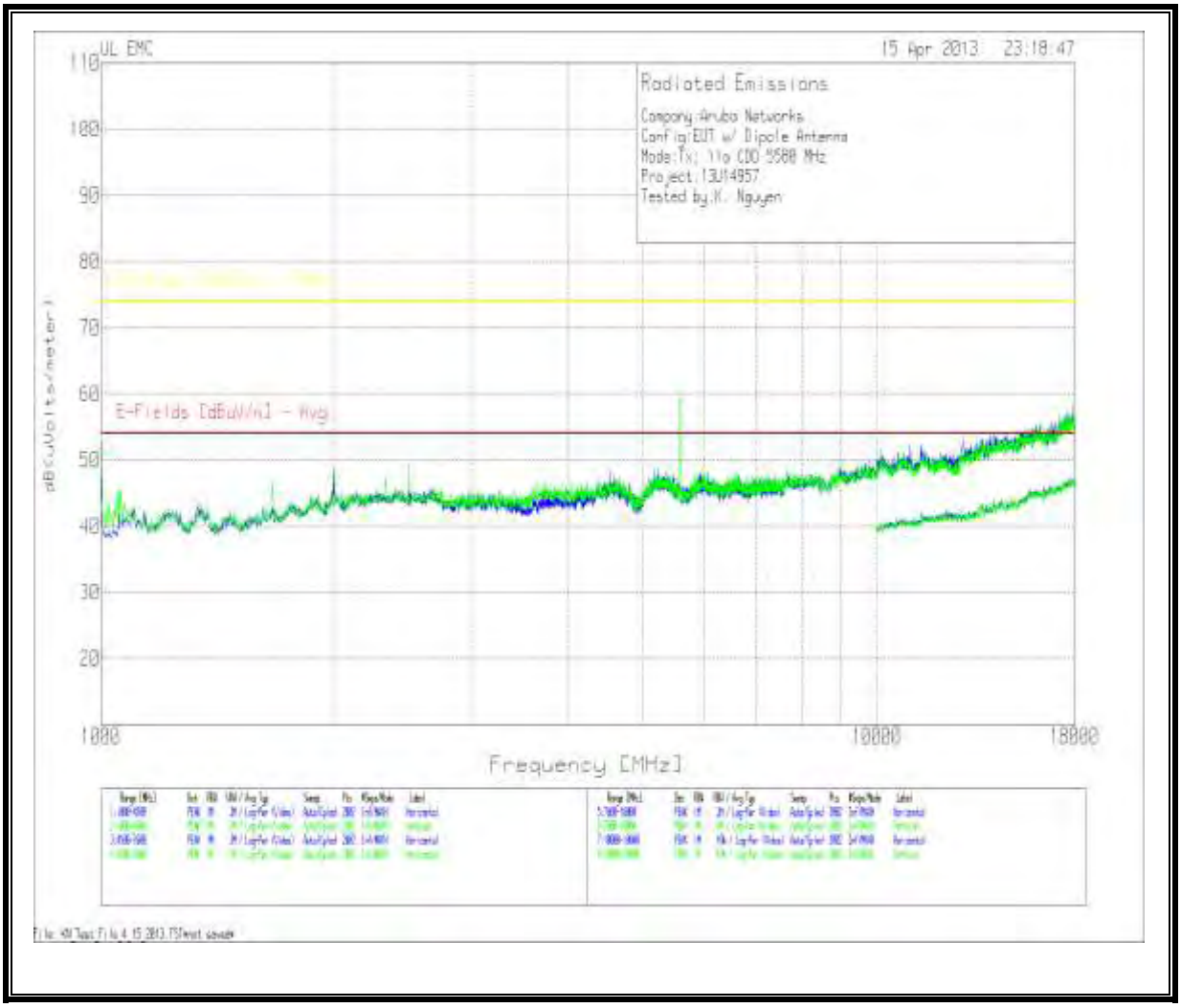
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1995.252	44.91	PK	31.7	-34.7	5.8	0	47.71	-	-	68.2	-20.49	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2**	1661.169	46.19	PK	29.4	-34.8	5.6	0	46.39	54	-7.61	74	-27.61	Vert
3*	1997.001	47.39	PK	31.7	-34.7	5.8	0	50.19	-	-	68.2	-18.01	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11a CDD 5580 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1993.503	44.87	PK	31.7	-34.7	5.8	0	47.67	-	-	68.2	-20.53	Horz
2**	2499.001	41.77	PK	32.4	-34.8	6.2	0	45.57	54	-8.43	74	-28.43	Horz

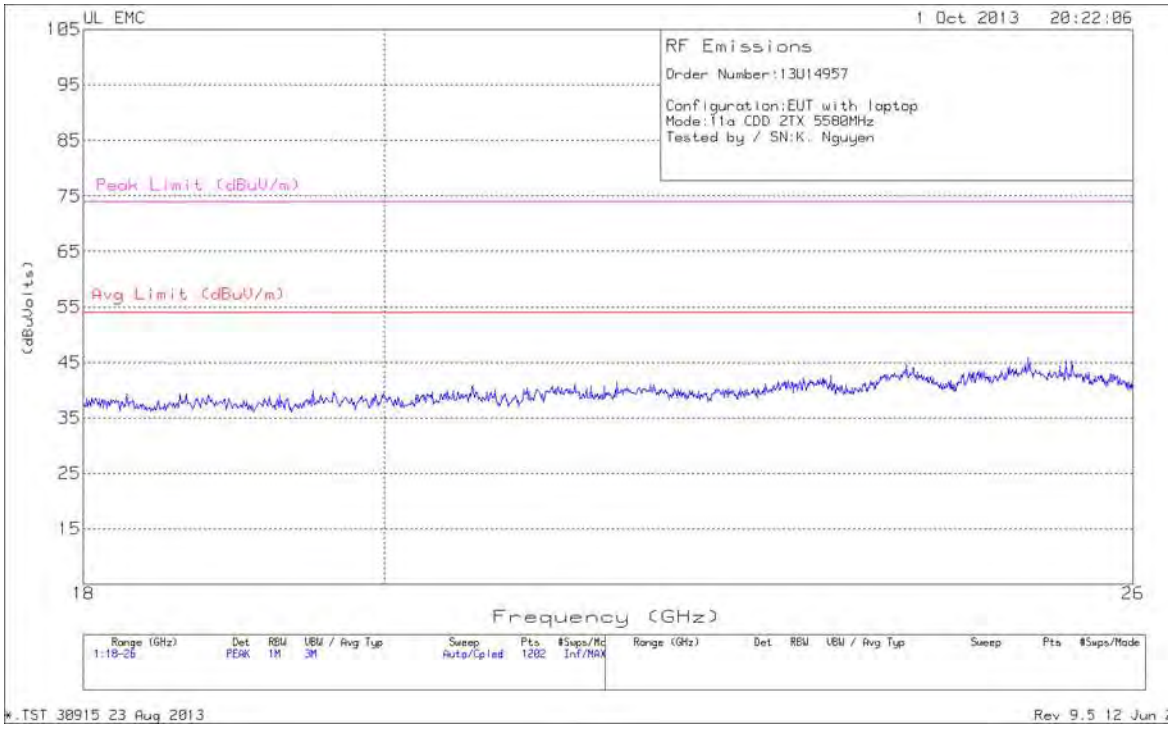
Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3**	1664.668	46.35	PK	29.4	-34.8	5.6	0	46.55	54	-7.45	74	-27.45	Vert
4*	1993.503	45.9	PK	31.7	-34.7	5.8	0	48.7	-	-	68.2	-19.5	Vert
5**	2331.084	43.53	PK	32.4	-34.8	6.1	0.1	47.33	54	-6.67	74	-26.67	Vert
6	2497.251	45.29	PK	32.4	-34.8	6.2	0.1	49.19	-	-	74	-24.81	Vert
6A	2497.251	30.66	VB1	32.4	-34.9	6.2	0	34.36	54	-19.64	-	-	Vert

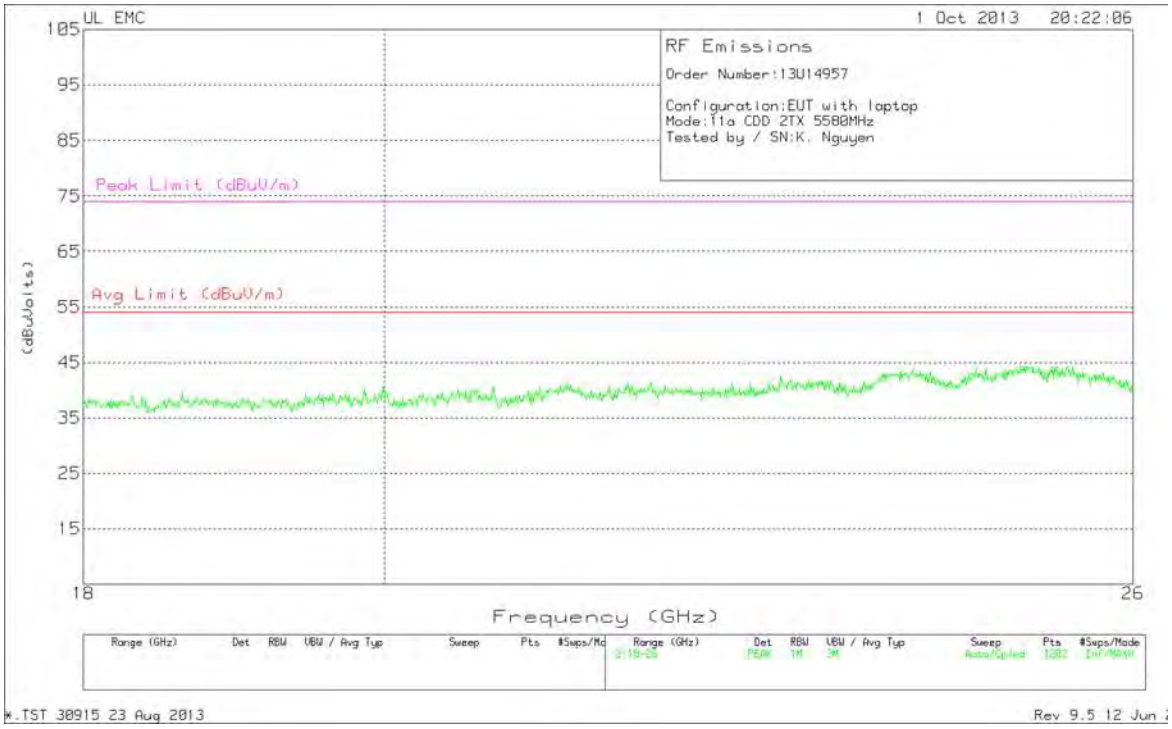
PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

18-26 GHz

Horizontal



Vertical



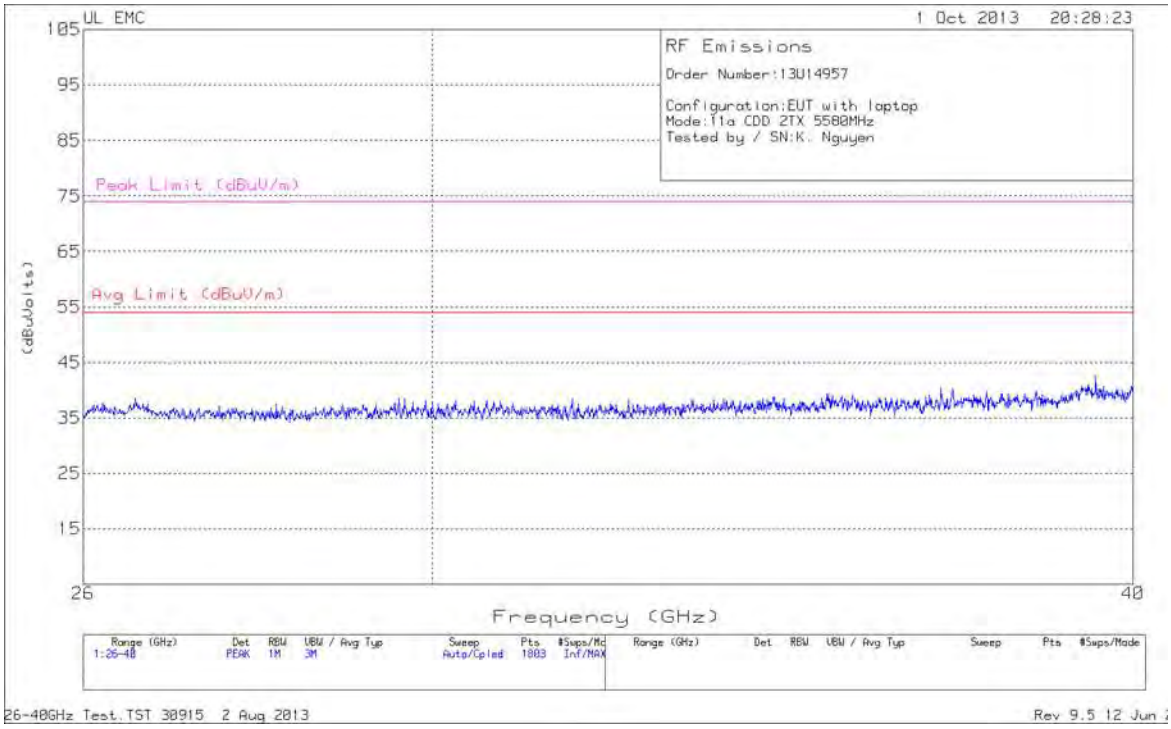
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Avg Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	25.061	43.93	PK	34	-22.6	-9.5	45.83	54	-8.17	74	-28.17
2	25.394	44.13	PK	33.7	-23	-9.5	45.33	54	-8.67	74	-28.67
3	19.992	41.17	PK	33	-24	-9.5	40.67	54	-13.33	74	-33.33
4	25.274	42.97	PK	33.6	-22.9	-9.5	44.17	54	-9.83	74	-29.83

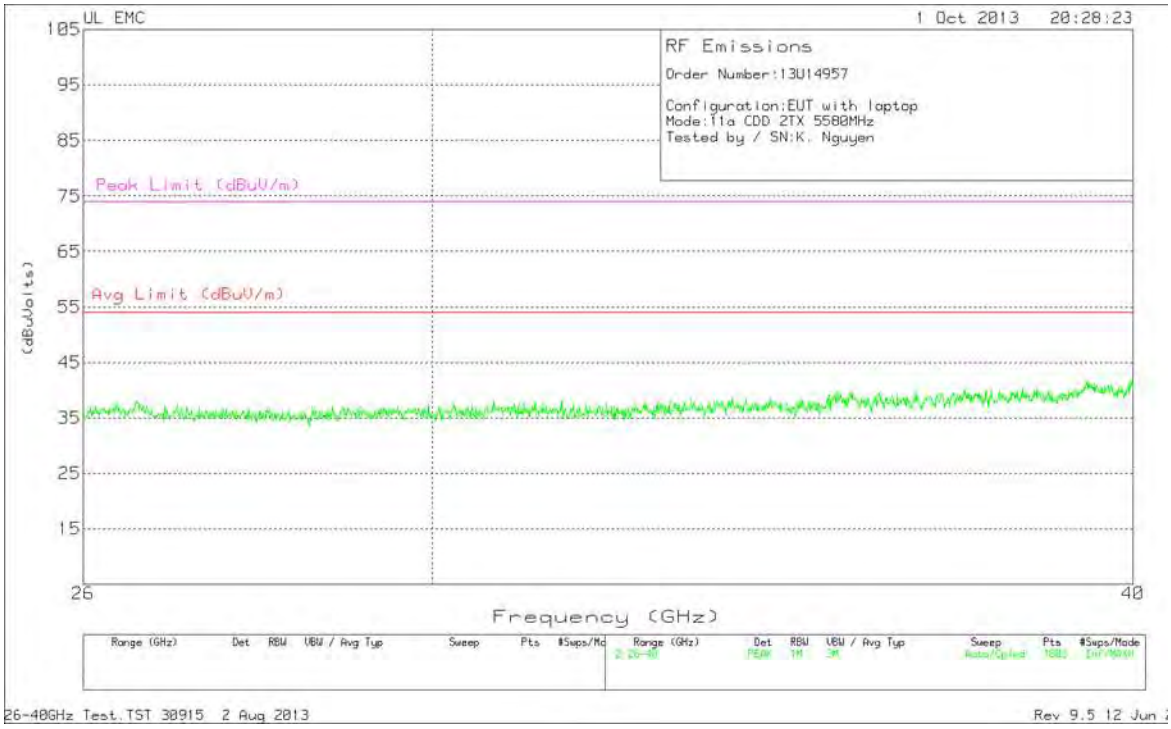
PK - Peak detector

26-40 GHz

Horizontal



Vertical

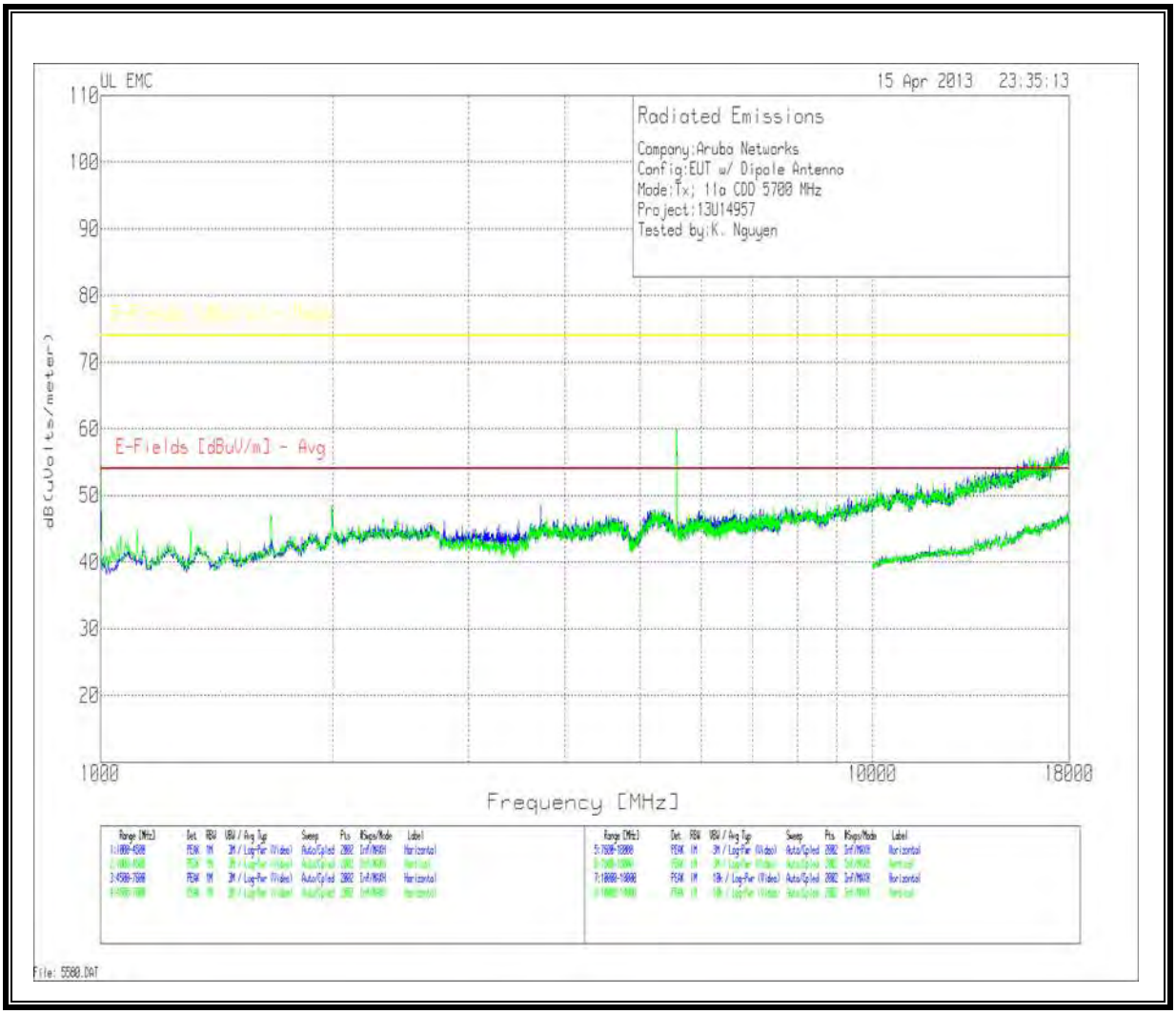


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Avg Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	39.386	50.07	PK	37.9	-35.8	-9.5	42.67	54	-11.33	74	-31.33
2	39.246	48.87	PK	38.6	-36.3	-9.5	41.67	54	-12.33	74	-32.33

PK - Peak detector

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11a CDD 5700 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1	3721.639	42.73	PK	33.7	-35	7.1	0	48.53	-	-	74	-25.47	Horz
1A	3721.639	28.09	VB1	33.8	-34.9	7.1	0	34.09	54	-19.91	-	-	Horz
2*	1435.532	42.3	PK	28.3	-35	5.3	0	40.9	-	-	68.2	-27.3	Horz

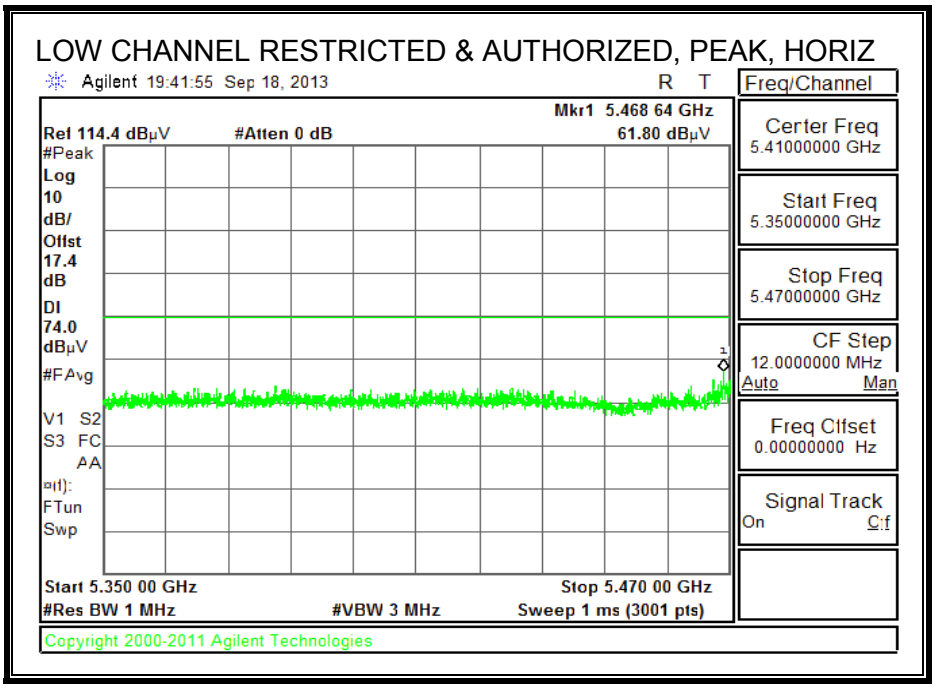
Vertical

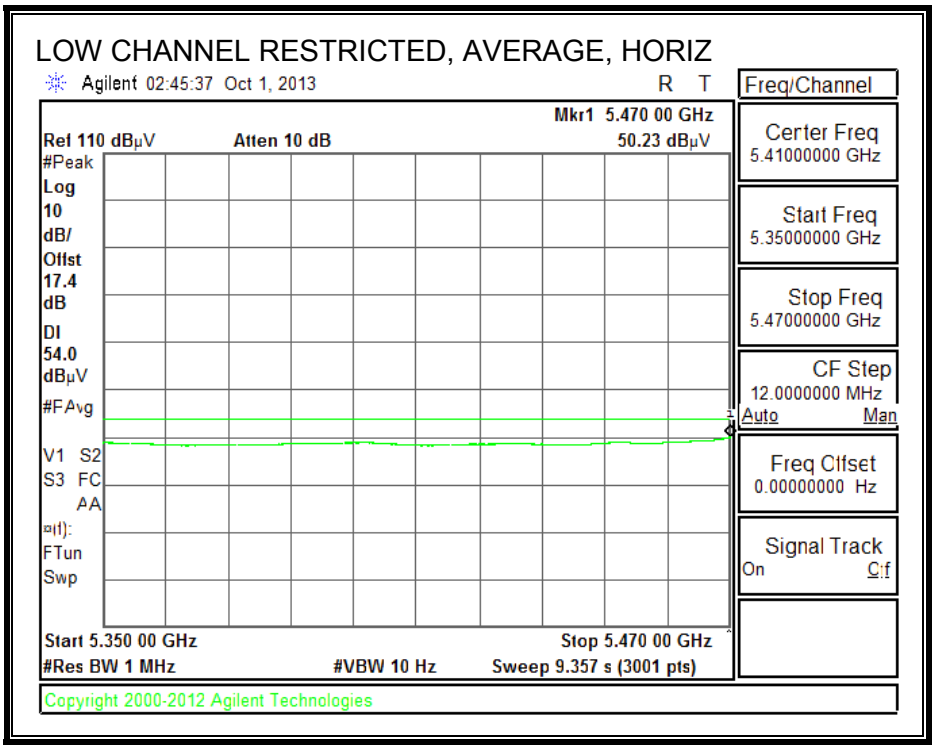
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3**	1117.191	47.82	PK	28.1	-35.6	4.9	0	45.22	54	-8.78	74	-28.78	Vert
4**	1309.595	46.96	PK	28.5	-35.2	5.1	0	45.36	54	-8.64	74	-28.64	Vert
5**	1662.919	46.9	PK	29.4	-34.8	5.6	0	47.1	54	-6.9	74	-26.9	Vert
6*	1995.252	45.7	PK	31.7	-34.7	5.8	0	48.5	-	-	68.2	-19.7	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

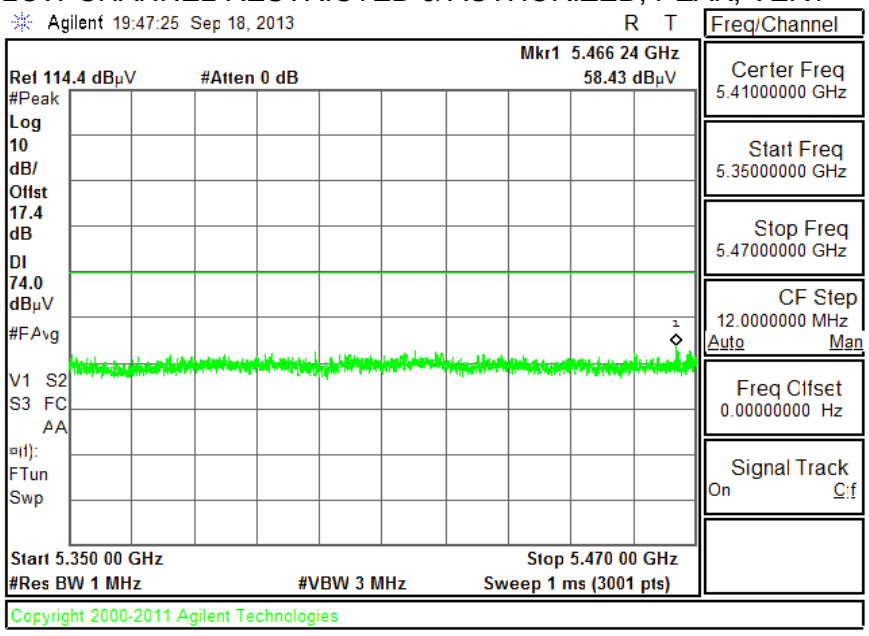
10.2.5. TX ABOVE 1 GHz 802.11n HT20 STBC MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)

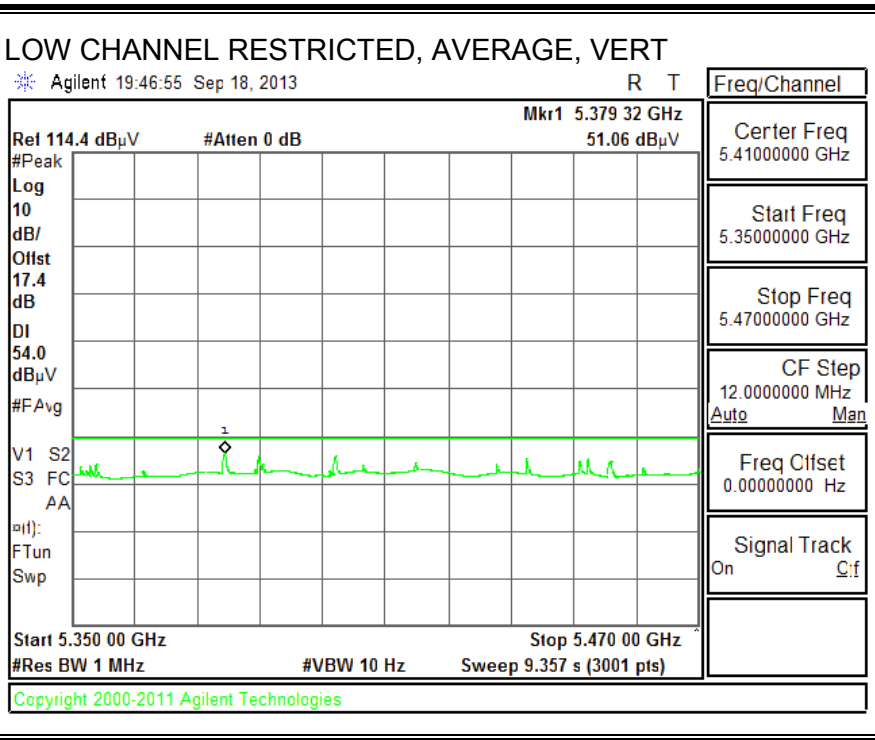




LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, VERT

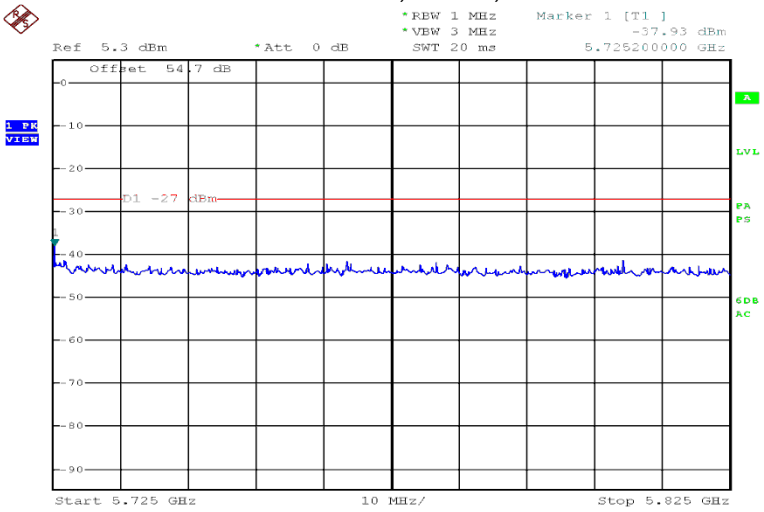


LOW CHANNEL RESTRICTED, AVERAGE, VERT



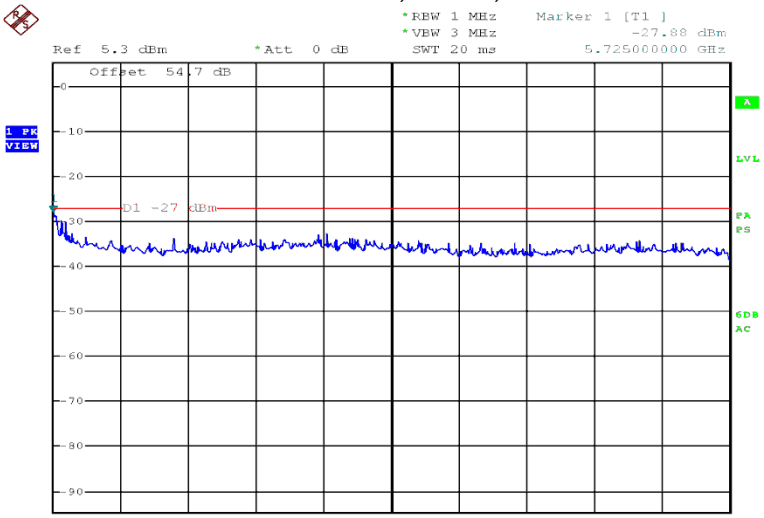
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL BANDEDGE, PEAK, HORIZ



Date: 14.APR.2013 14:42:04

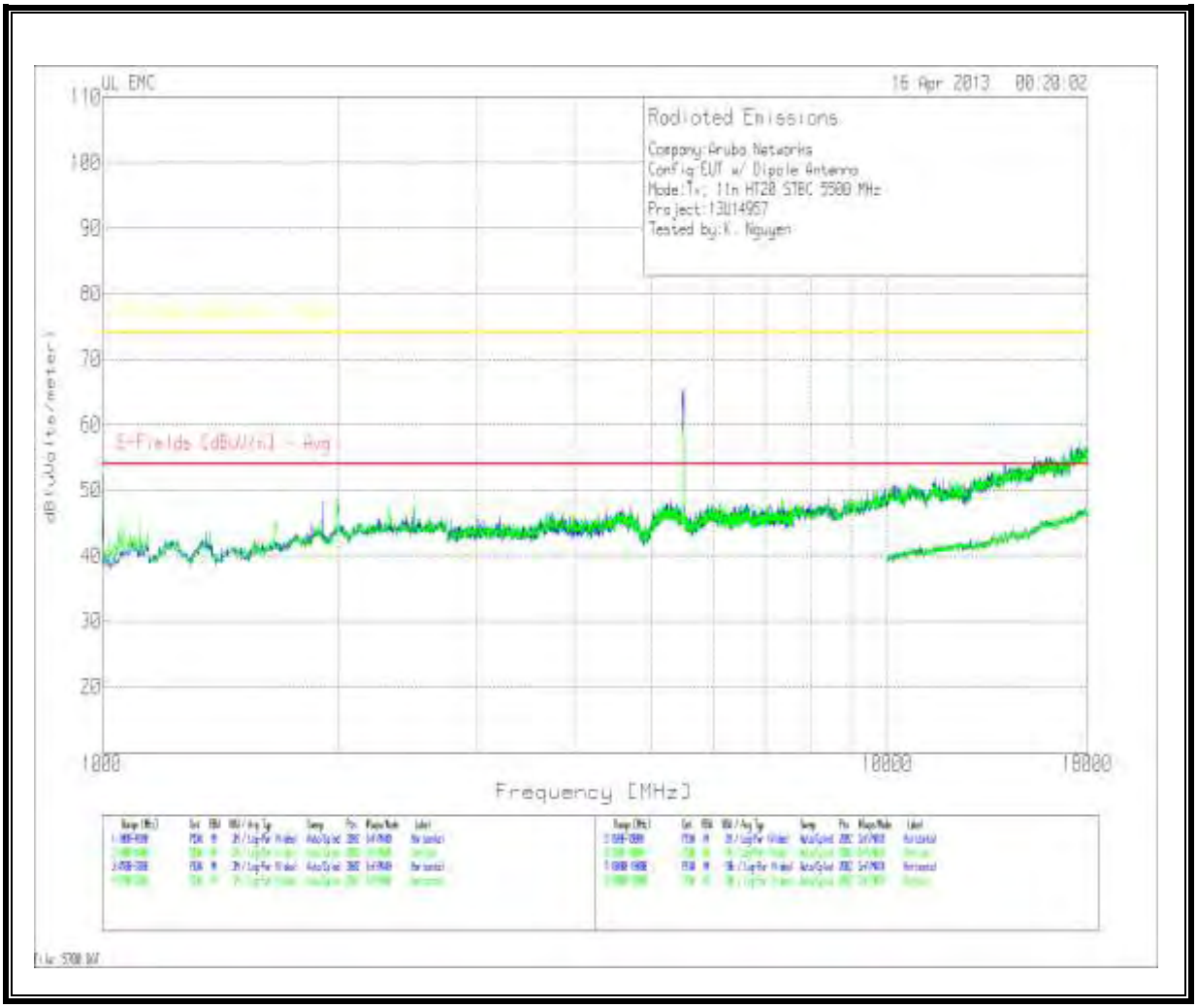
HIGH CHANNEL BANDEDGE, PEAK, VERT



Date: 14.APR.2013 14:44:38

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Company:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11n HT20 STBC 5500 MHz
Project:13U14957
Tested by:K. Nguyen

Horizontal

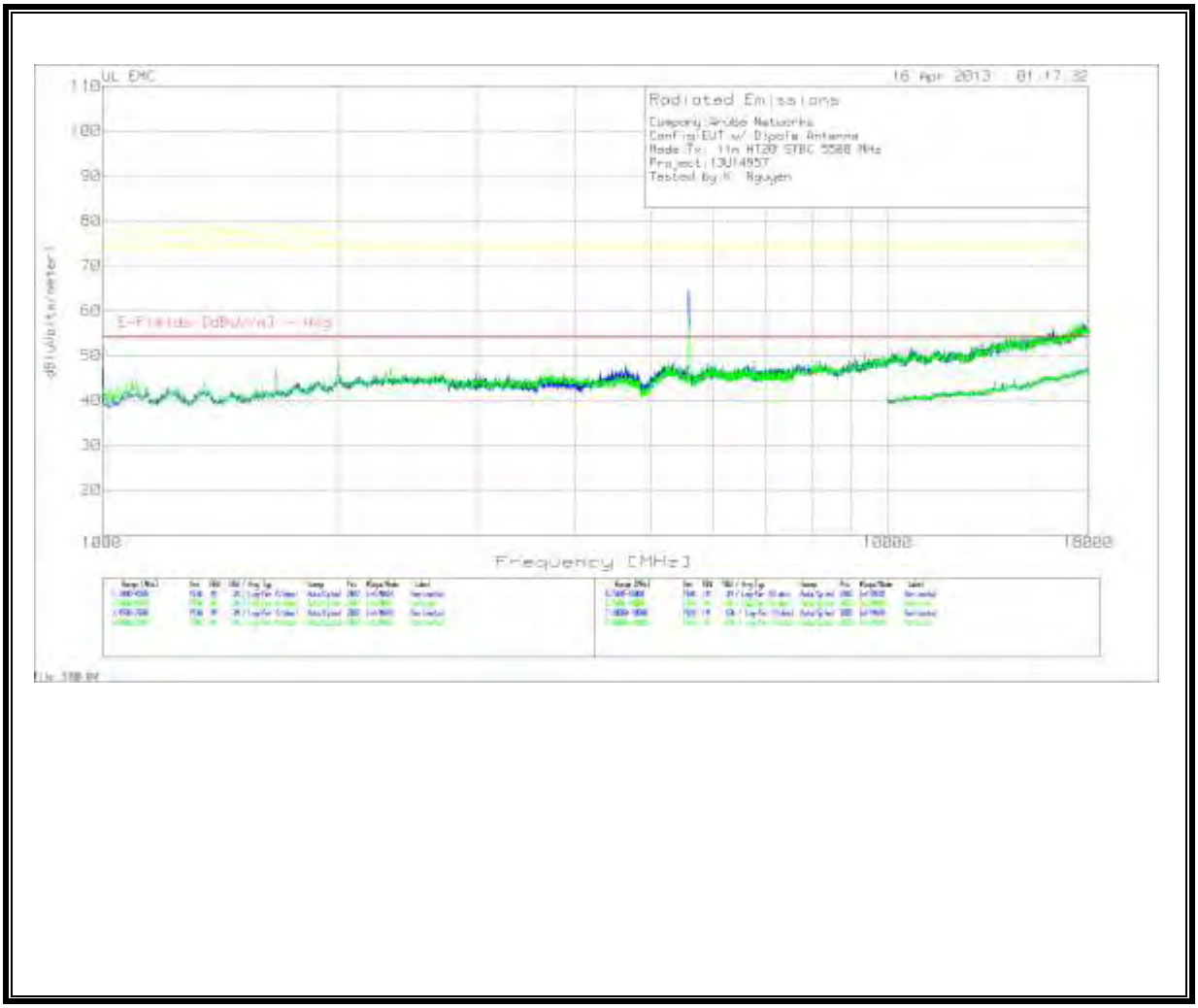
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1906.047	46.21	PK	31.1	-34.8	5.7	0	48.21	-	-	68.2	-19.99	Horz
2*	1993.503	45.47	PK	31.7	-34.7	5.8	0	48.27	-	-	68.2	-19.93	Horz
8	7328.886	38.81	PK	35.9	-35.3	9.2	0	48.61	-	-	74	-25.39	Horz
8A	7328.886	26.91	VB1	35.9	-35.3	9.2	0	36.71	54	-17.29	-	-	Horz
7**	7651.974	37.29	PK	36	-35.4	9.3	0.5	47.69	54	-6.31	74	-26.31	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3**	1664.668	45.33	PK	29.4	-34.8	5.6	0	45.53	54	-8.47	74	-28.47	Vert
4*	1991.754	46.25	PK	31.6	-34.7	5.8	0	48.95	-	-	68.2	-19.25	Vert
5	2493.753	45.38	PK	32.4	-34.8	6.2	0.1	49.28	-	-	74	-24.72	Vert
5A	2493.753	27.77	VB1	32.4	-34.9	6.2	0	31.47	54	-22.53	-	-	Vert
6**	7631.184	36.73	PK	36	-35.3	9.5	0.3	47.23	54	-6.77	74	-26.77	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11n HT20 STBC 5580 MHz
Test By:K. Nguyen

Horizontal

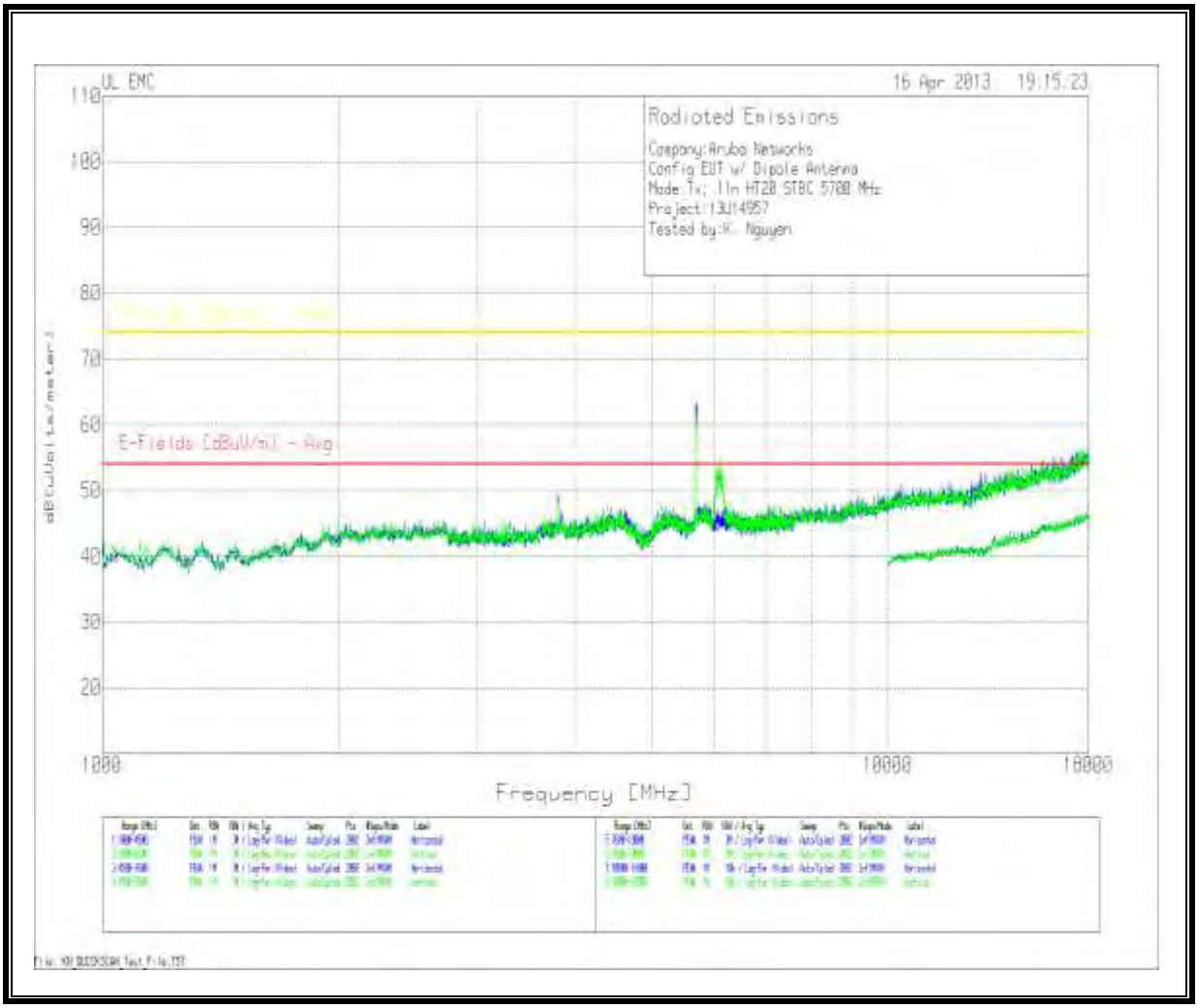
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1998.751	43.04	PK	31.7	-34.7	5.8	0	45.84	-	-	68.2	-22.36	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2**	1662.919	46.6	PK	29.4	-34.8	5.6	0	46.8	54	-7.2	74	-27.2	Vert
3*	1993.503	46.06	PK	31.7	-34.7	5.8	0	48.86	-	-	68.2	-19.34	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11n HT20 STBC 5700 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1	3802.099	43.12	PK	33.8	-35	7.2	0.2	49.32	-	-	74	-24.68	Horz
1A	3802.099	29.38	VB1	33.8	-35	7.2	0.2	35.58	54	-18.42	-	-	Horz
2*	6132.884	36.52	PK	35.9	-35	8.6	0.2	46.22	-	-	68.2	-21.98	Horz

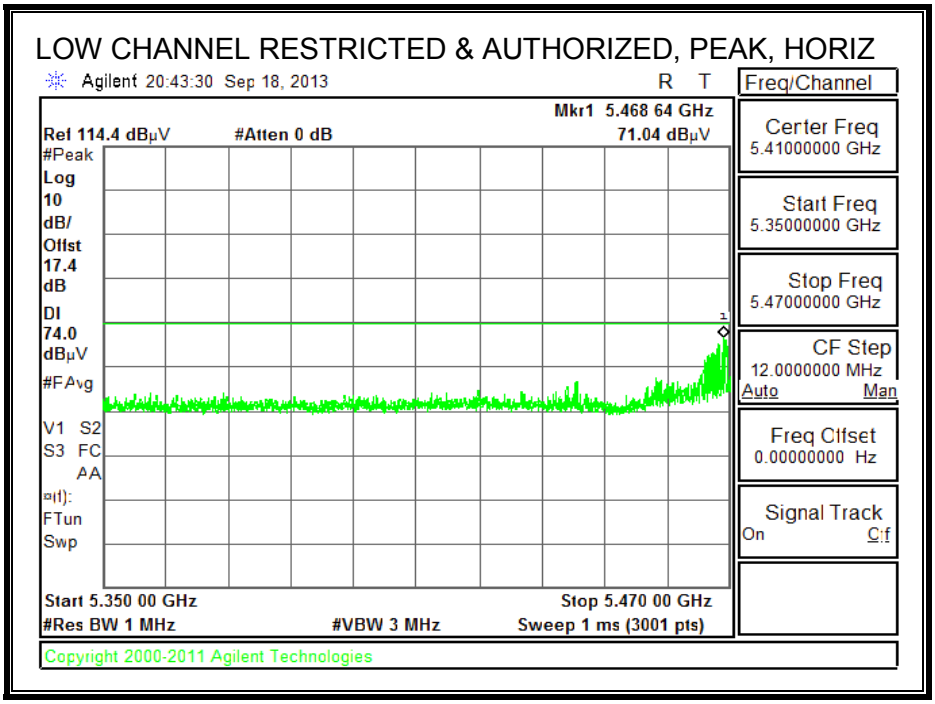
Vertical

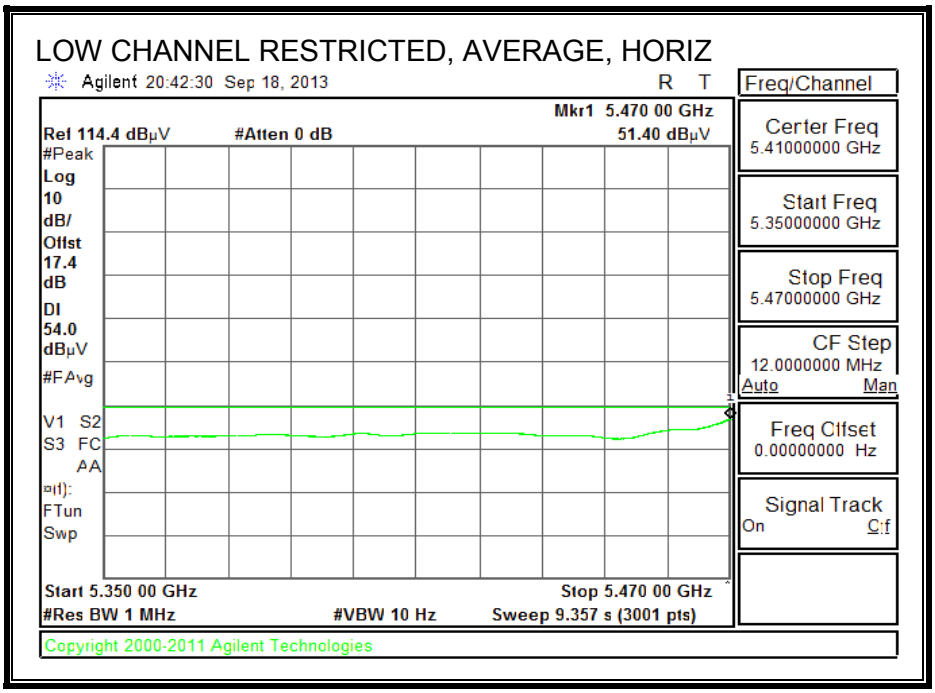
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3	3800.35	41.82	PK	33.8	-35	7.2	0.2	48.02	-	-	74	-25.98	Vert
3A	3800.35	32.95	VB1	33.8	-35	7.2	0.2	39.15	54	-14.85	-	-	Vert
4*	6114.293	45.76	PK	35.8	-35	8.6	0.3	55.46	-	-	68.2	-12.74	Vert

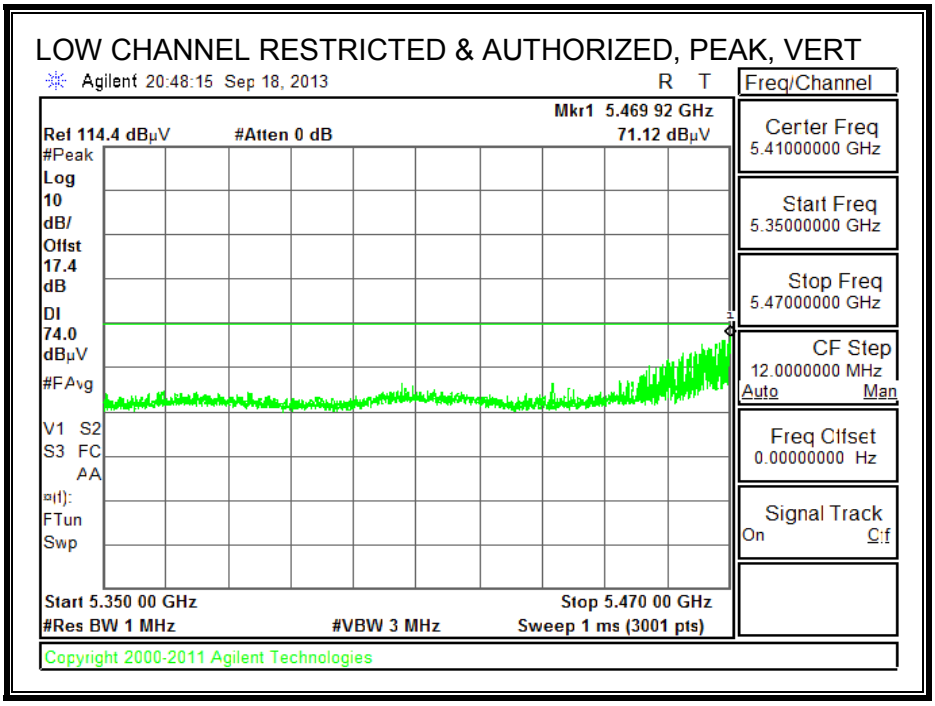
PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

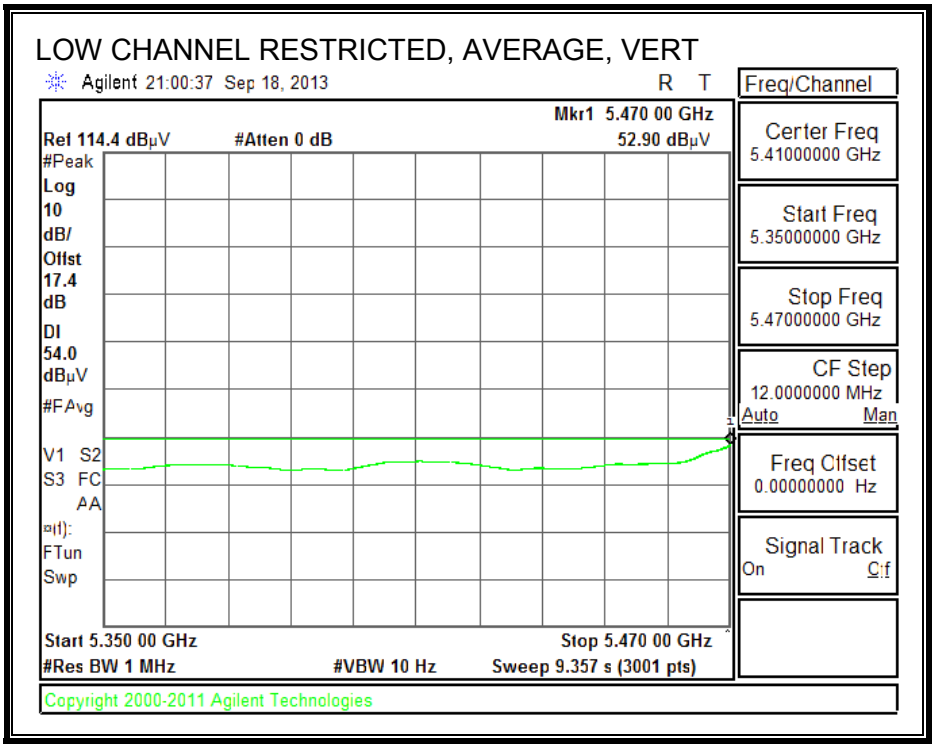
10.2.6. TX ABOVE 1 GHz 802.11n HT40 STBC MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)



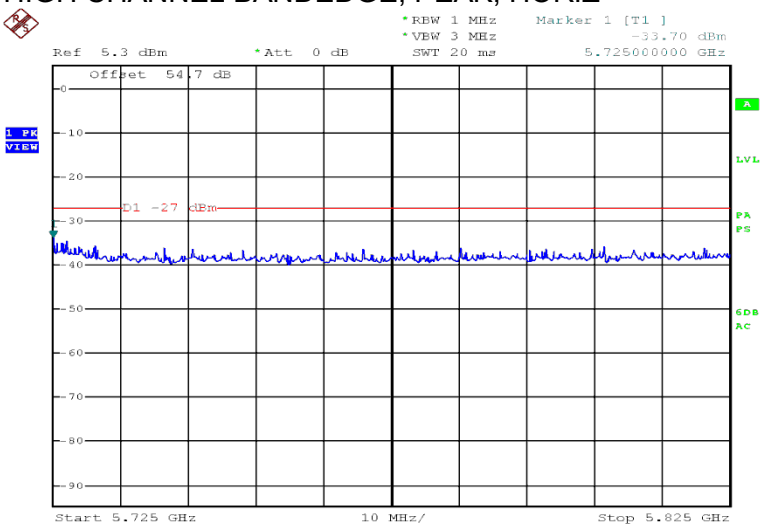






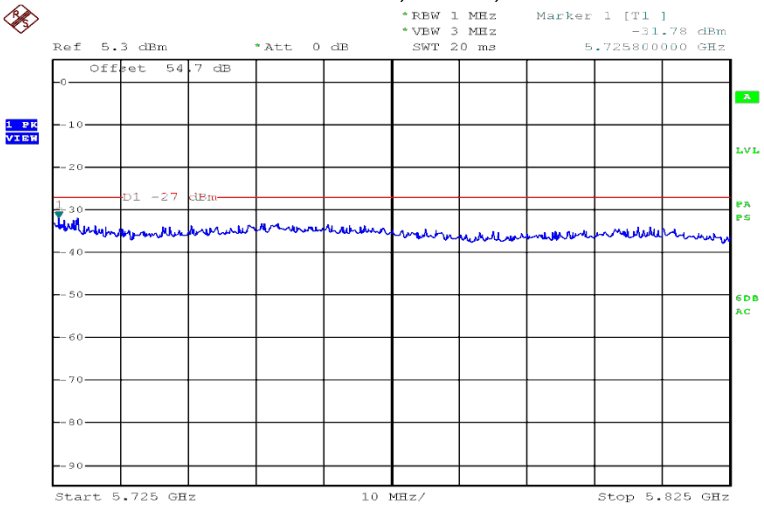
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL BANDEDGE, PEAK, HORIZ



Date: 14.APR.2013 14:53:28

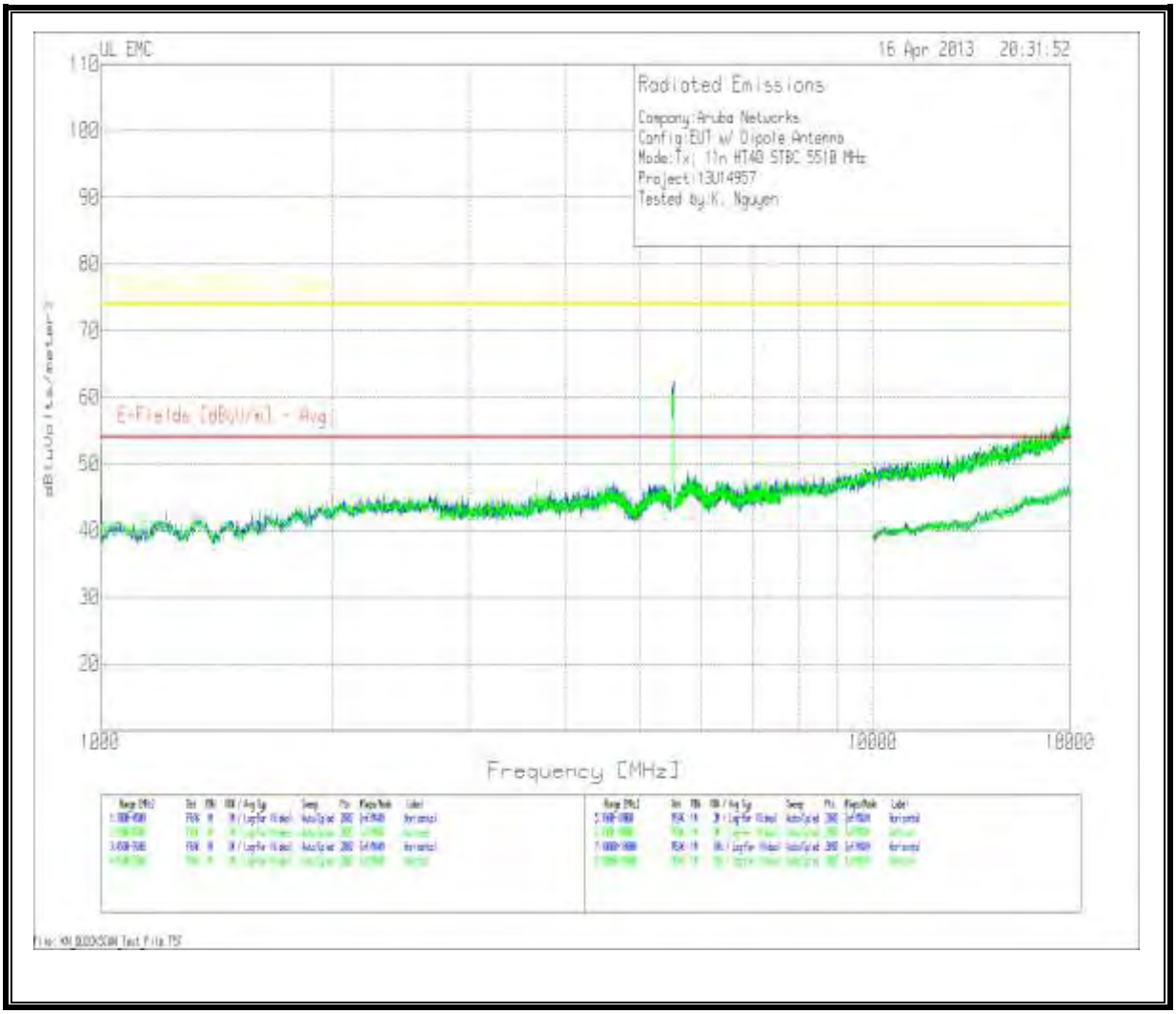
HIGH CHANNEL BANDEDGE, PEAK, VERT



Date: 14.APR.2013 14:54:27

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11n HT40 STBC 5510 MHz
Test By:K. Nguyen

Horizontal

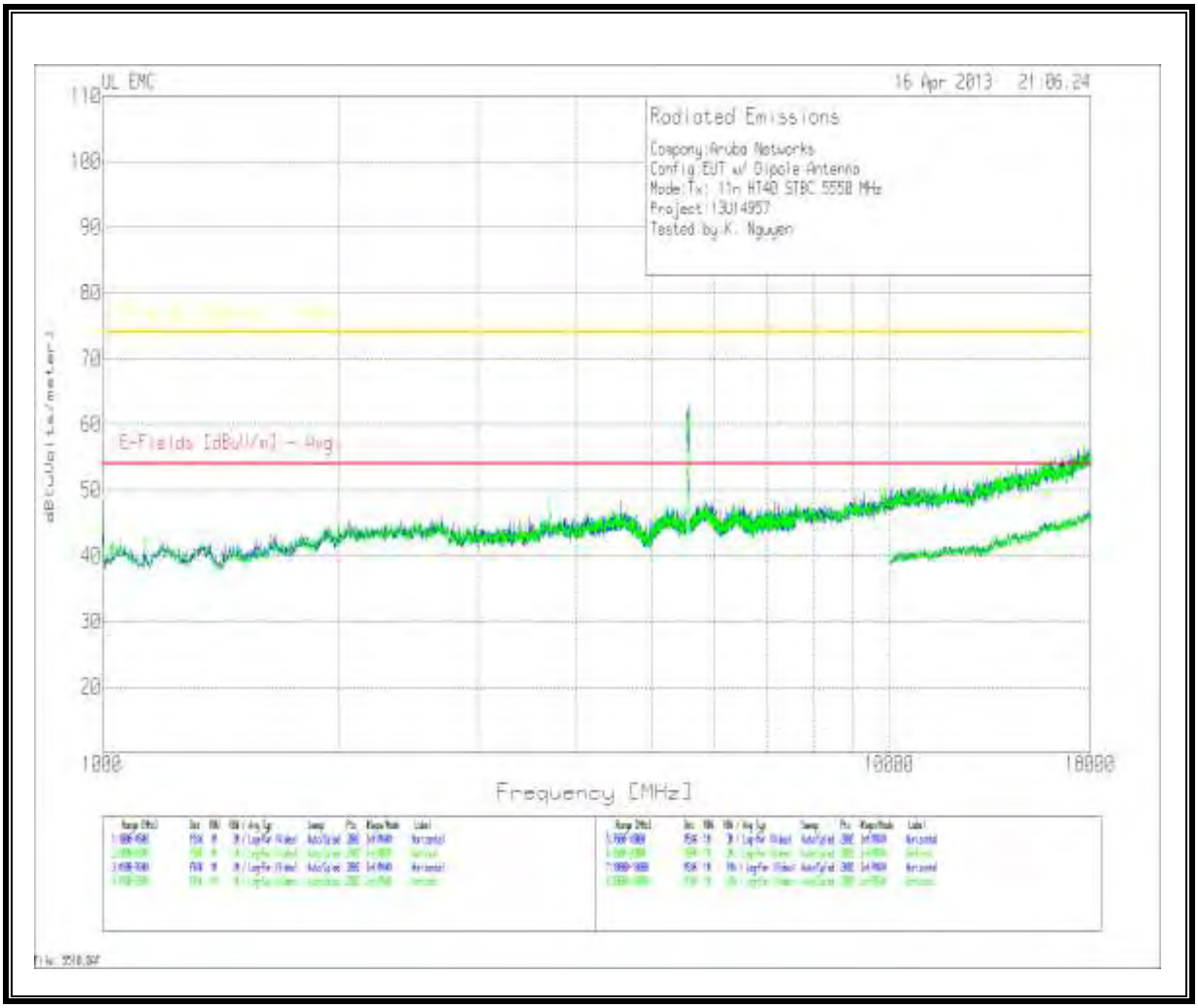
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	9767.316	36.45	PK	37.4	-35.9	10.3	0.4	48.65	-	-	68.2	-19.55	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2*	1993.503	42.17	PK	31.7	-34.7	5.8	0.1	45.07	-	-	68.2	-23.13	Vert
3**	3674.413	41.87	PK	33.6	-35	7.2	0.1	47.77	54	-6.23	74	-26.23	Vert
4*	9741.329	37.42	PK	37.4	-35.9	10.4	0.2	49.52	-	-	68.2	-18.68	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11n HT40 STBC 5550 MHz
Test By:K. Nguyen

Horizontal

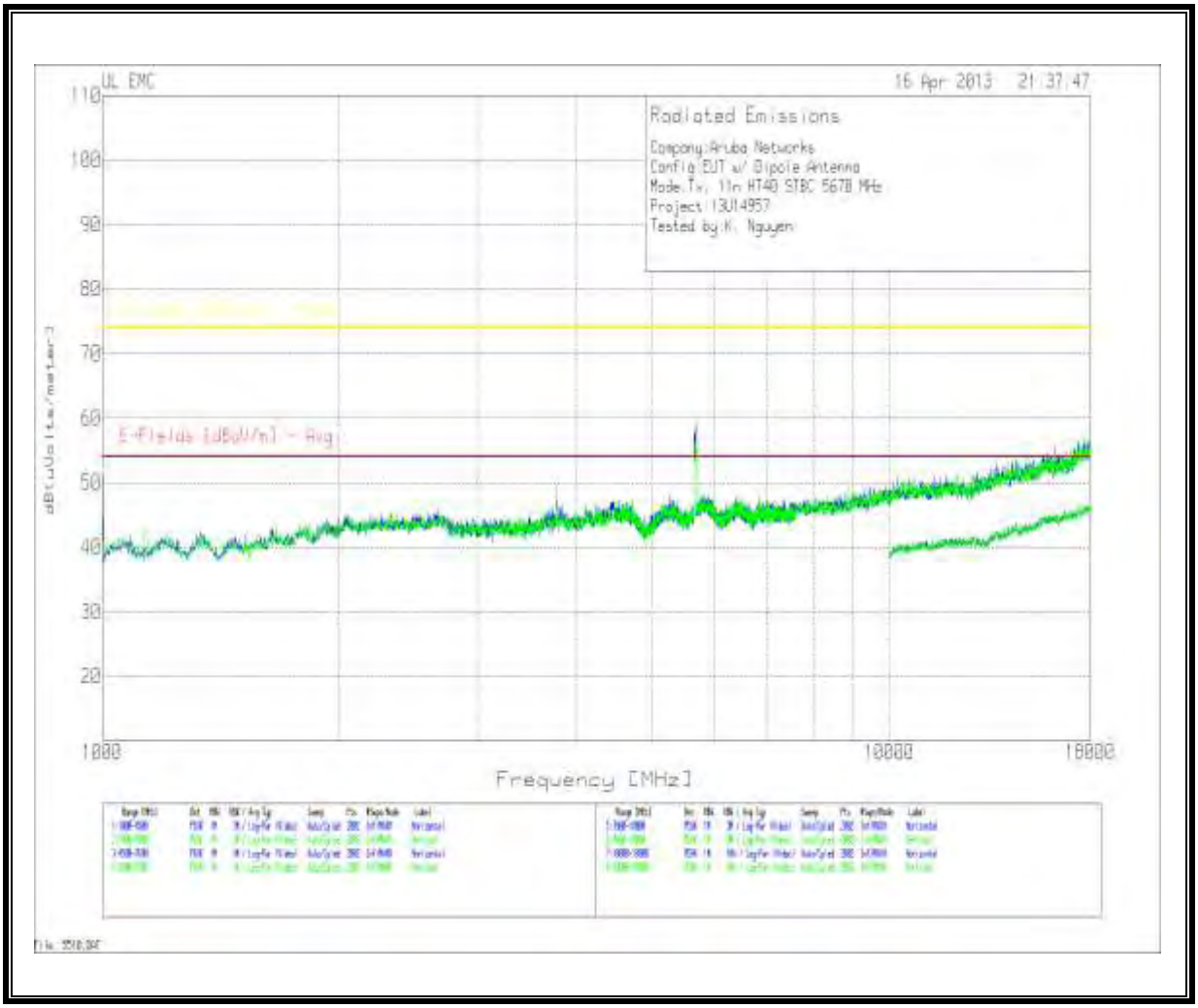
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1932.284	41.42	PK	31.2	-34.7	5.8	0.1	43.82	-	-	68.2	-24.38	Horz
2**	9096.852	35.73	PK	36.8	-35.6	10.1	0.3	47.33	54	-6.67	74	-26.67	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3*	1935.782	42.54	PK	31.3	-34.7	5.8	0.1	45.04	-	-	68.2	-23.16	Vert
4	3700.65	43.43	PK	33.7	-35	7.1	0	49.23	-	-	74	-24.77	Vert
	3700.65	29.07	VB1	33.7	-35	7.1	0	34.87	54	-19.13	-	-	Vert
5*	9881.659	38.22	PK	37.7	-35.9	10.4	0.3	50.72	-	-	68.2	-17.48	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Dipole Antenna
Mode:Tx; 11n HT40 STBC 5670 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1	3781.109	43.37	PK	33.8	-35	7.2	0.1	49.47	-	-	74	-24.53	Horz
	3781.109	30.75	VB1	33.8	-35	7.2	0.2	36.95	54	-17.05	-		Horz
3*	8759.02	37.36	PK	36.4	-35.5	9.9	0.2	48.36	-	-	68.2	-19.84	Horz

Vertical

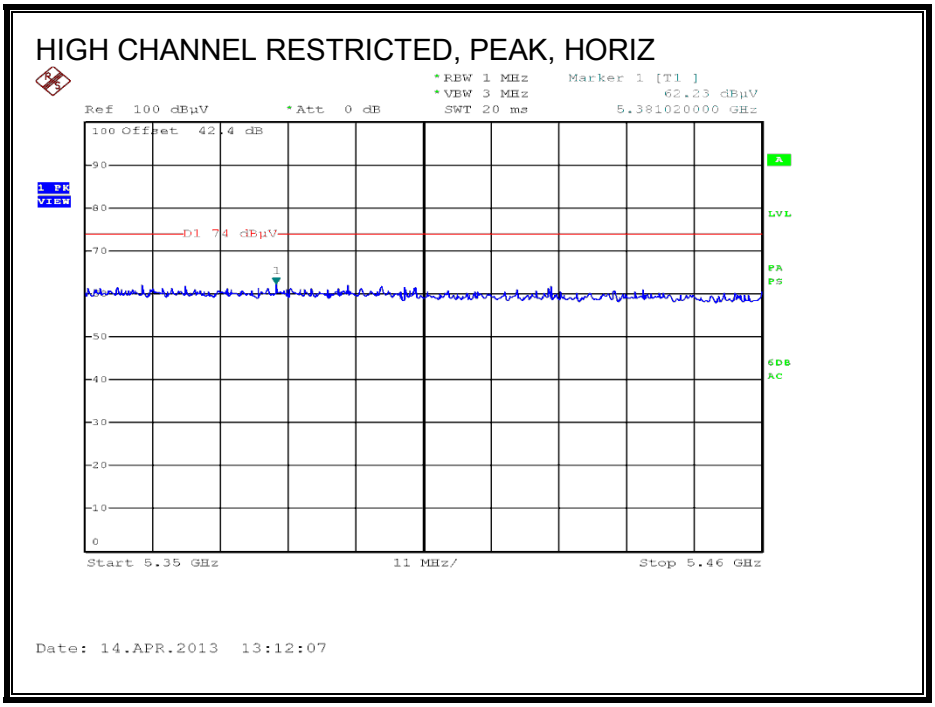
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2	3781.109	42.77	PK	33.8	-35	7.2	0.1	48.87	-	-	74	-25.13	Vert
	3781.109	30.93	VB1	33.8	-34.9	7.2	0.1	37.13	54	-16.87	-	-	Vert
4*	8888.956	38.27	PK	36.6	-35.6	10	0.3	49.57	-	-	68.2	-18.63	Vert

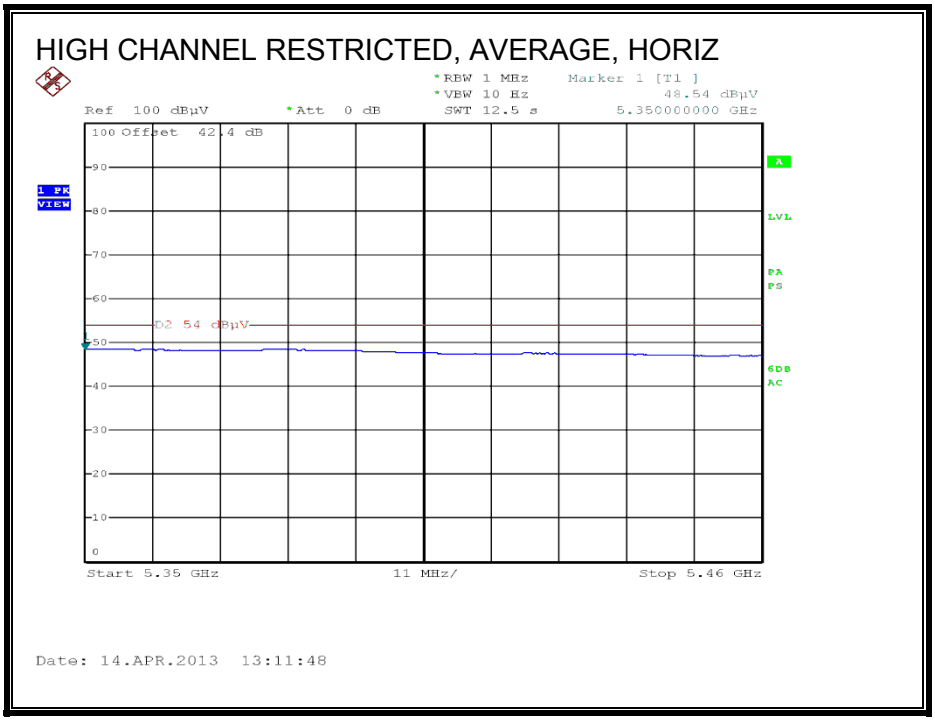
PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

10.3. PATCH ANTENNA

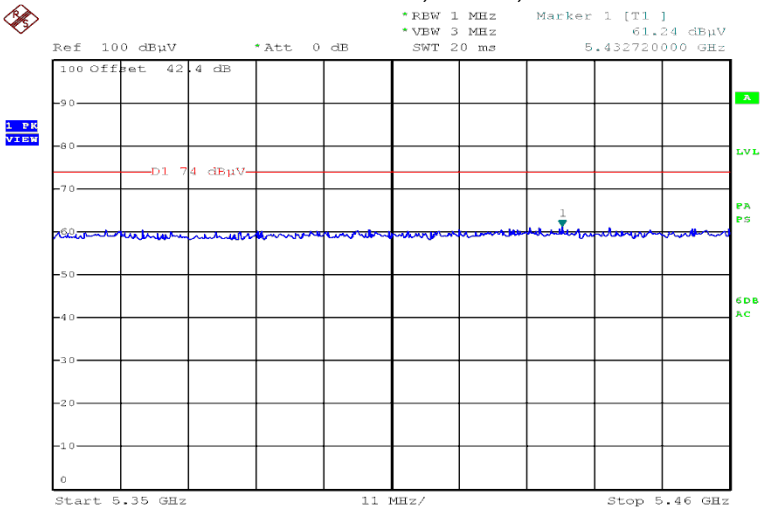
10.3.1. TX ABOVE 1 GHz 802.11a CDD 2TX MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

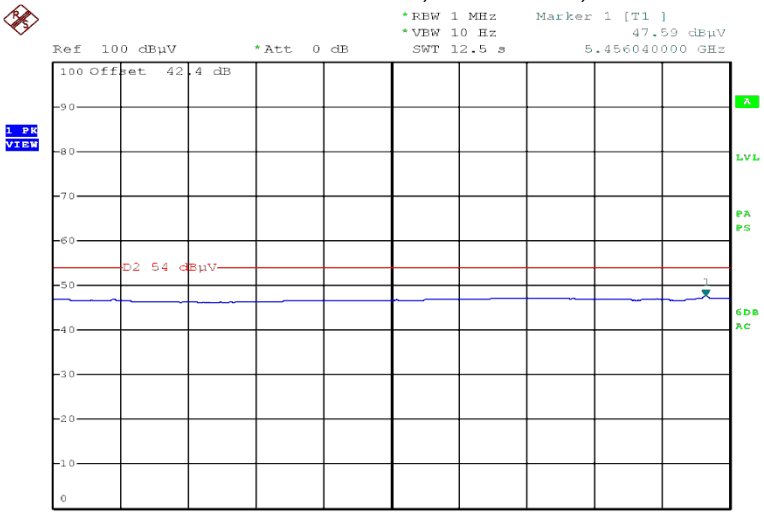




HIGH CHANNEL RESTRICTED, PEAK, VERT

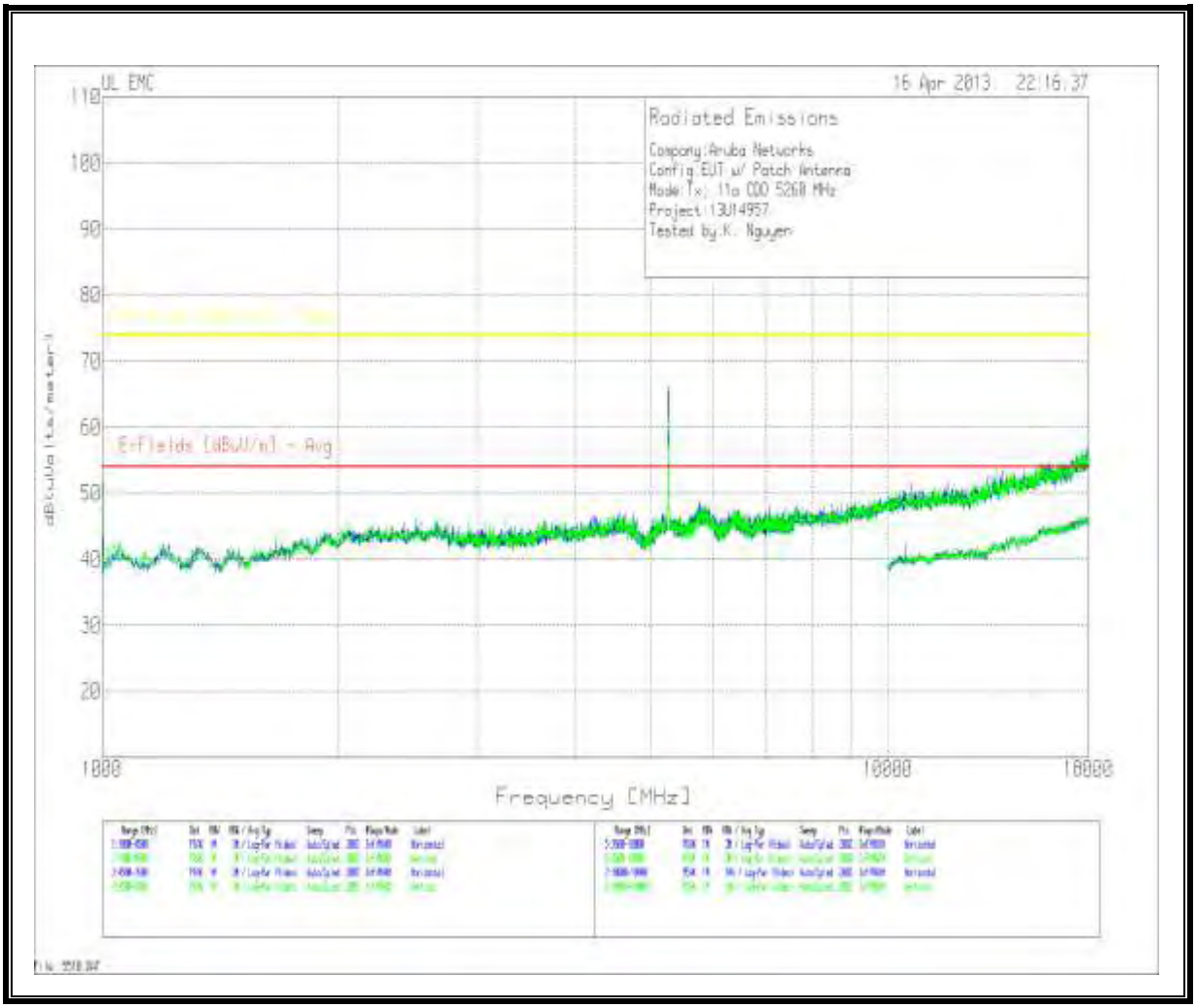


HIGH CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11a CDD 5260 MHz
Test By:K. Nguyen

Horizontal

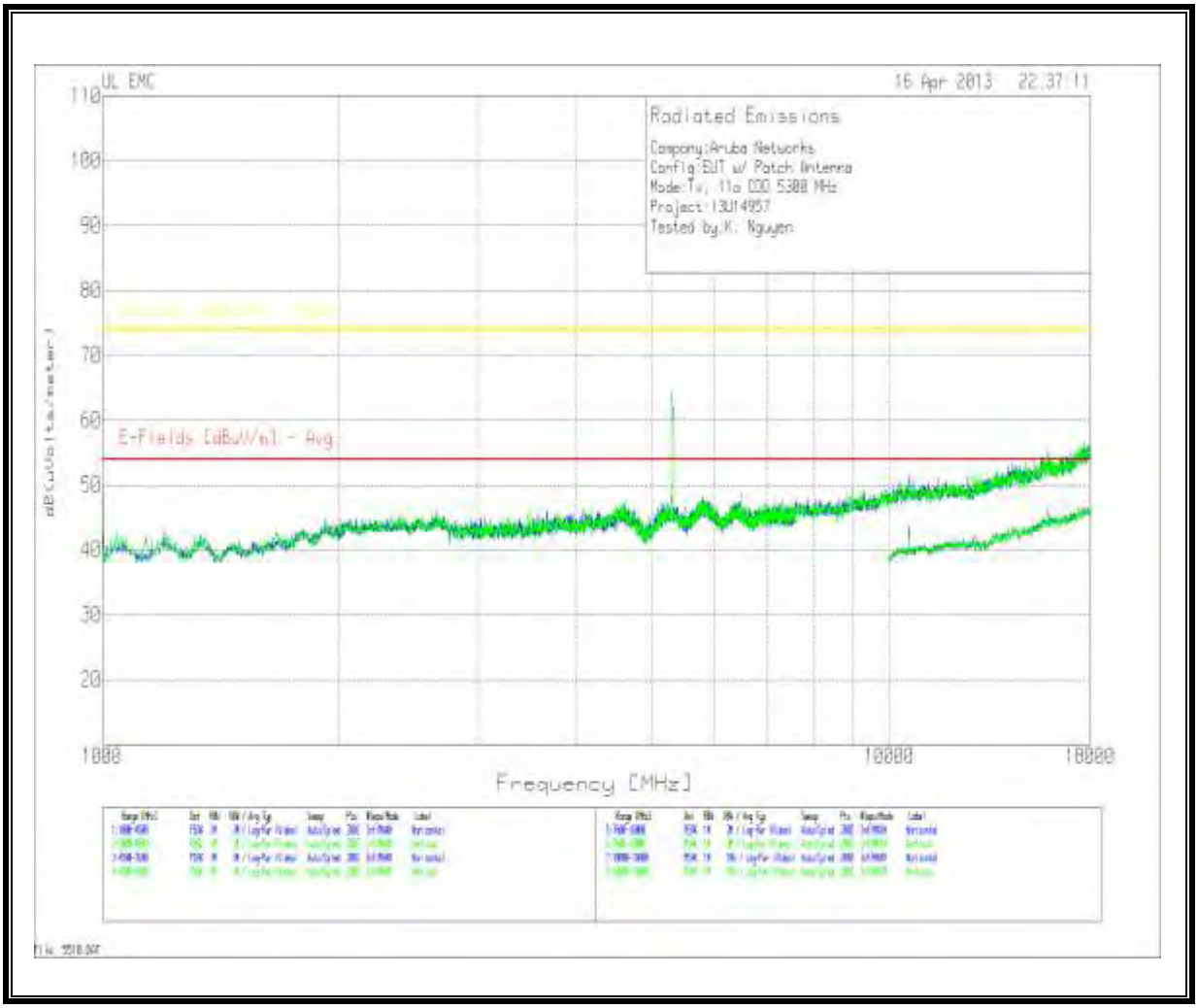
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	3142.679	39.93	PK	33.2	-35.2	6.7	0.2	44.83	-	-	68.2	-23.37	Horz
2*	5914.443	37.84	PK	35.6	-34.9	8.5	0.6	47.64	-	-	68.2	-20.56	Horz
3*	8545.927	36.8	PK	36.2	-35.5	9.7	0.2	47.4	-	-	68.2	-20.8	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
4**	3265.117	41.23	PK	33.3	-35.1	6.9	0.1	46.43	54	-7.57	74	-27.57	Vert
5*	5877.261	37.21	PK	35.5	-34.9	8.5	1	47.31	-	-	68.2	-20.89	Vert
6**	9143.628	36.27	PK	36.8	-35.6	10.1	0.3	47.87	54	-6.13	74	-26.13	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11a CDD 5300 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1**	3677.911	39.95	PK	33.7	-35	7.2	0.1	45.95	54	-8.05	74	-28.05	Horz
5*	8961.719	35.94	PK	36.7	-35.6	10	0.3	47.34	-	-	68.2	-20.86	Horz

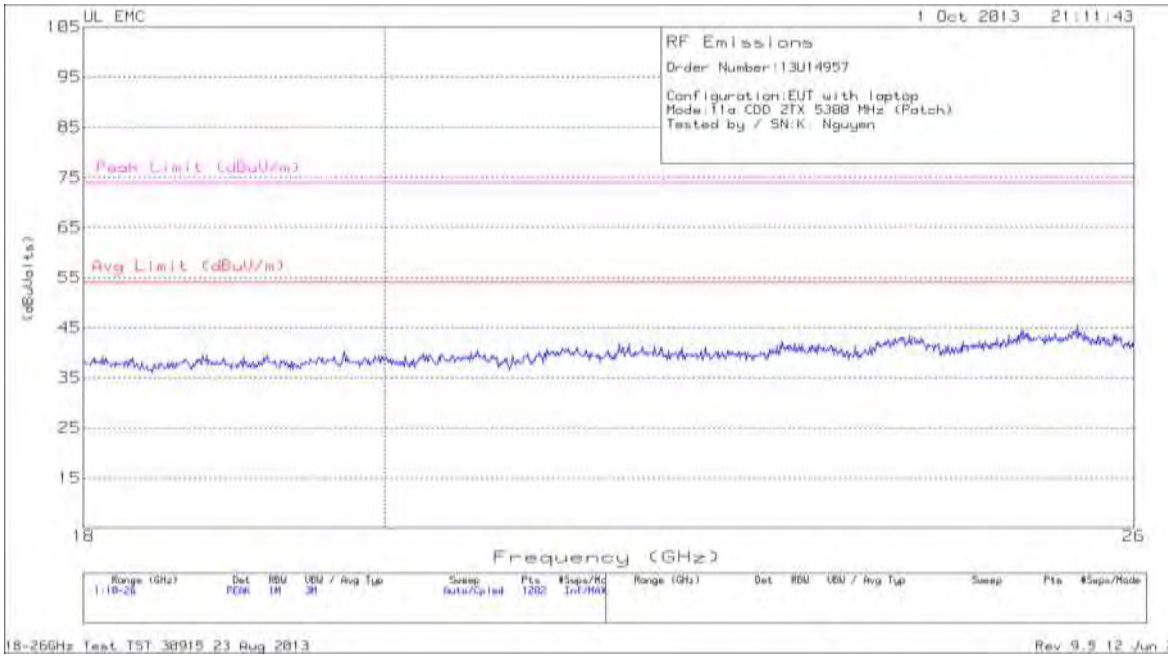
Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2*	3476.762	41.74	PK	33.3	-35	7	0.1	47.14	-	-	68.2	-21.06	Vert
3*	4493.003	38.63	PK	34.2	-35	7.7	0.2	45.73	-	-	68.2	-22.47	Vert
4**	4715.342	38.29	PK	34.4	-35	7.7	0.2	45.59	54	-8.41	74	-28.41	Vert
6**	9096.852	36.27	PK	36.8	-35.6	10.1	0.3	47.87	54	-6.13	74	-26.13	Vert

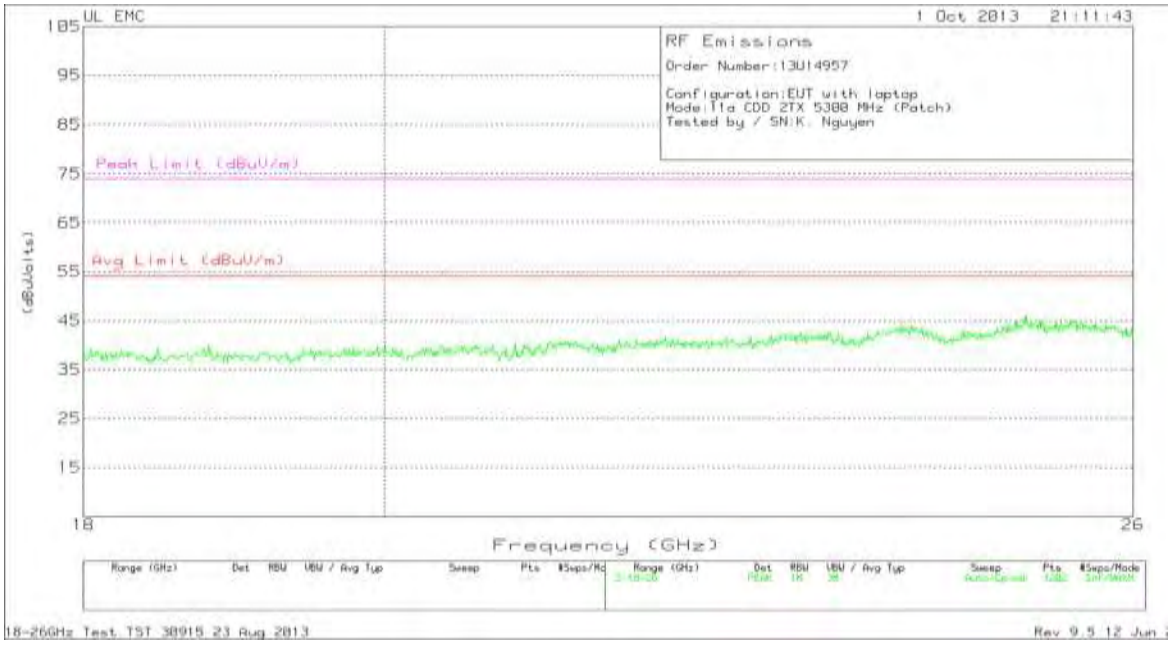
PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

18-26 GHz

Horizontal



Vertical



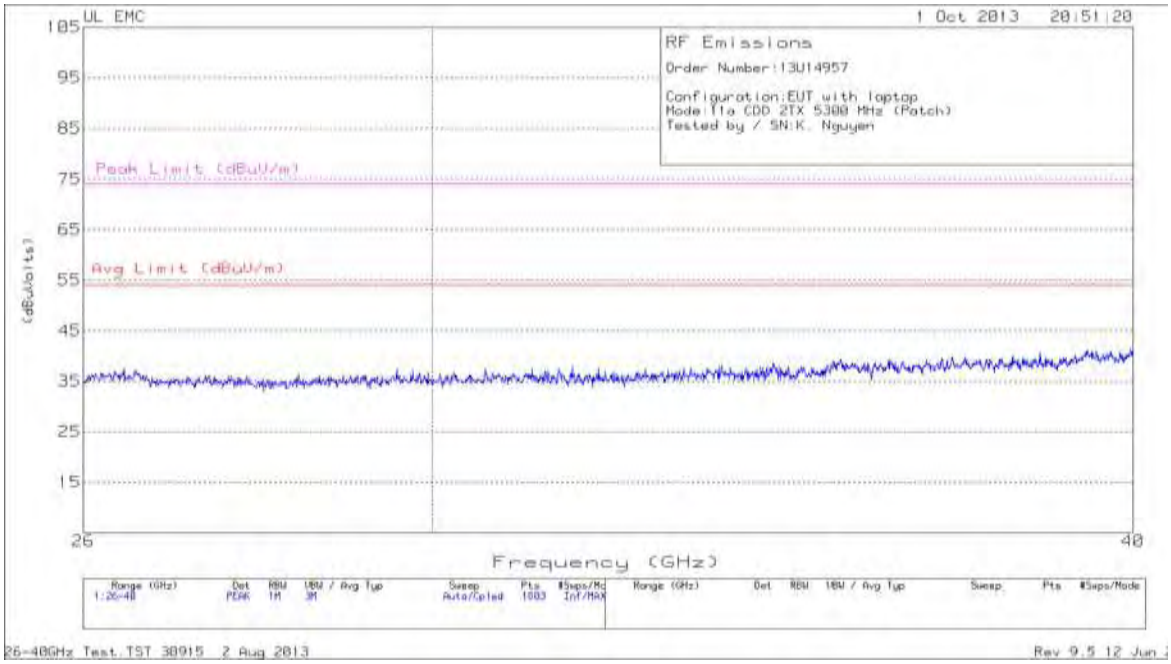
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Avg Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	25.494	44.4	PK	33.9	-23.3	-9.5	45.50	54	-8.50	74	-28.50
2	25.047	44	PK	34.1	-22.6	-9.5	46.00	54	-8.00	74	-28.00
3	18.473	41.3	PK	32.4	-24.7	-9.5	39.50	54	-14.50	74	-34.50

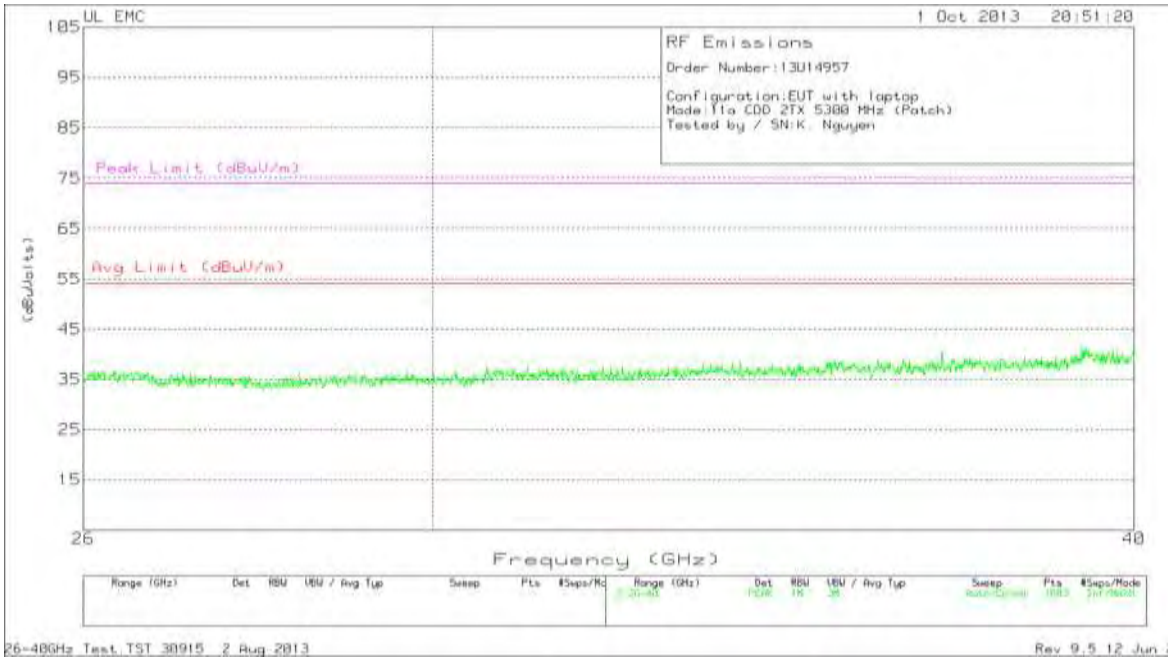
PK - Peak detector

26-40 GHz

Horizontal



Vertical

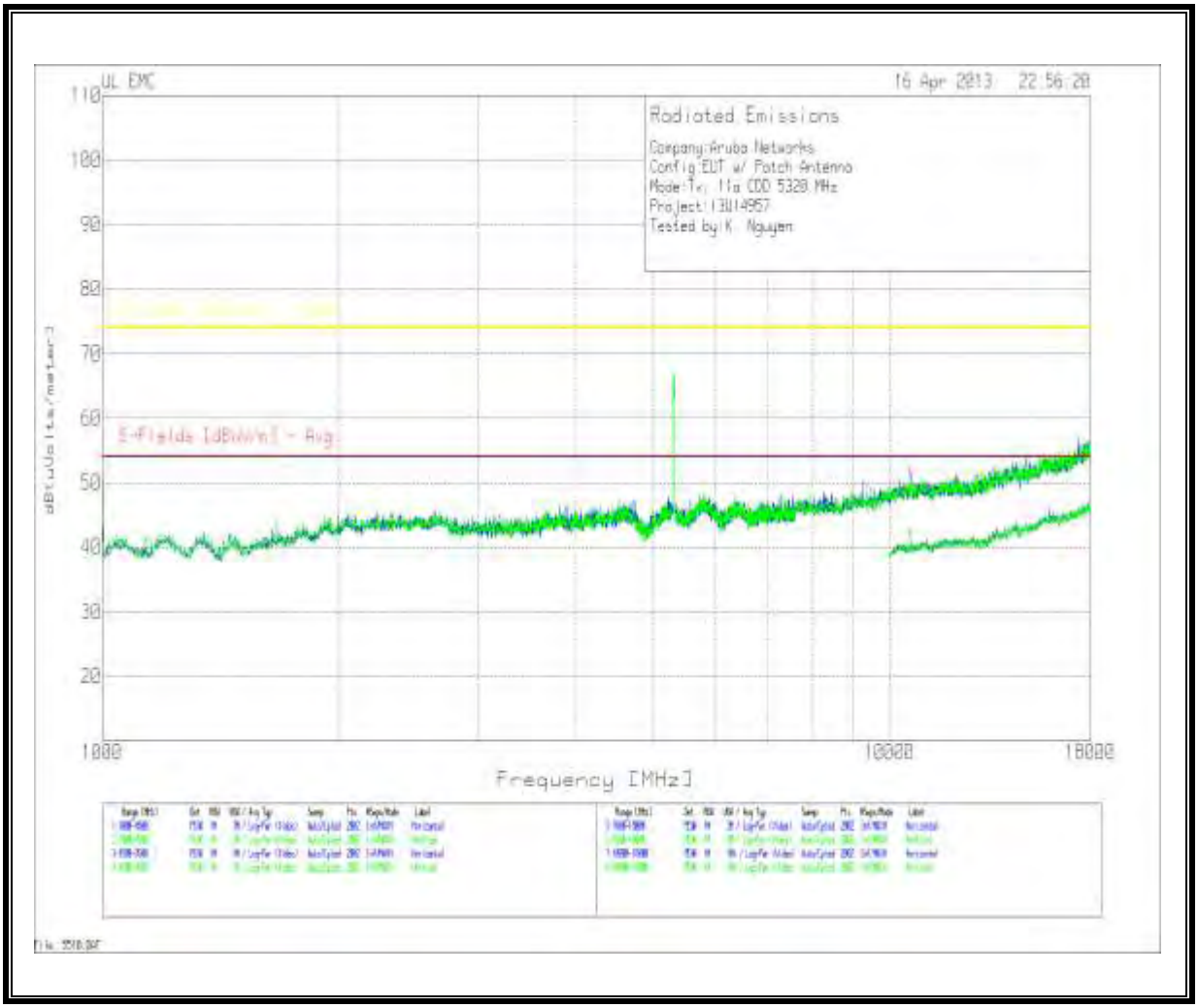


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Avg Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	37.133	49.53	PK	37.2	-37.4	-9.5	39.83	54	-14.17	74	-34.17
4	36.978	49.4	PK	37.2	-37.6	-9.5	39.50	54	-14.50	74	-34.50
2	36.97	50.57	PK	37.2	-37.6	-9.5	40.67	54	-13.33	74	-33.33
3	39.153	49.93	PK	38.1	-36.7	-9.5	41.83	54	-12.17	74	-32.17

PK - Peak detector

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode: Tx; 11a CDD 5320 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1**	2231.384	41.88	PK	32.3	-34.8	6	0.1	45.48	54	-8.52	74	-28.52	Horz
4*	9242.379	38.78	PK	36.9	-35.7	10.2	0.2	50.38	-	-	68.2	-17.82	Horz
6**	10635.682	28.9	PK	38.4	-35.4	10.7	0.2	42.8	54	-11.2	74	-31.2	Horz

Vertical

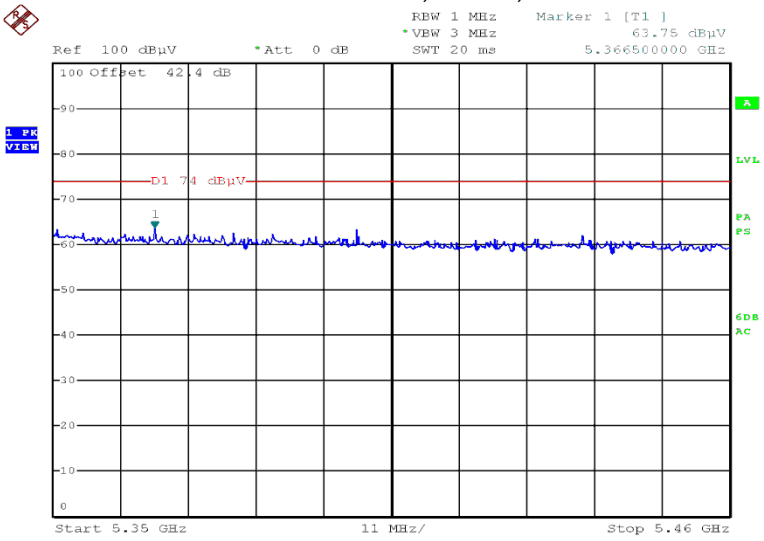
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2**	1664.668	44	PK	29.4	-34.8	5.6	0.1	44.3	54	-9.7	74	-29.7	Vert
3**	3660.42	41.2	PK	33.6	-35	7.1	0.2	47.1	54	-6.9	74	-26.9	Vert
5**	9367.116	38.31	PK	37	-35.7	10.2	0.3	50.11	-	-	74	-23.89	Vert
5A	9367.116	24.73	VB1	37	-35.7	10.2	0.3	36.53	54	-17.47	-	-	Vert
7**	10639.68	28.75	PK	38.4	-35.4	10.7	0.1	42.55	54	-11.45	74	-31.45	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

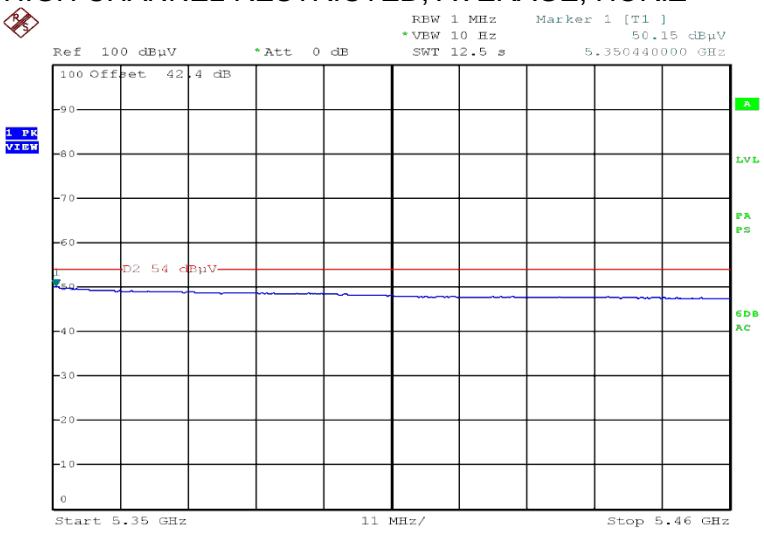
10.3.2. TX ABOVE 1 GHz 802.11n HT20 STBC 2TX MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

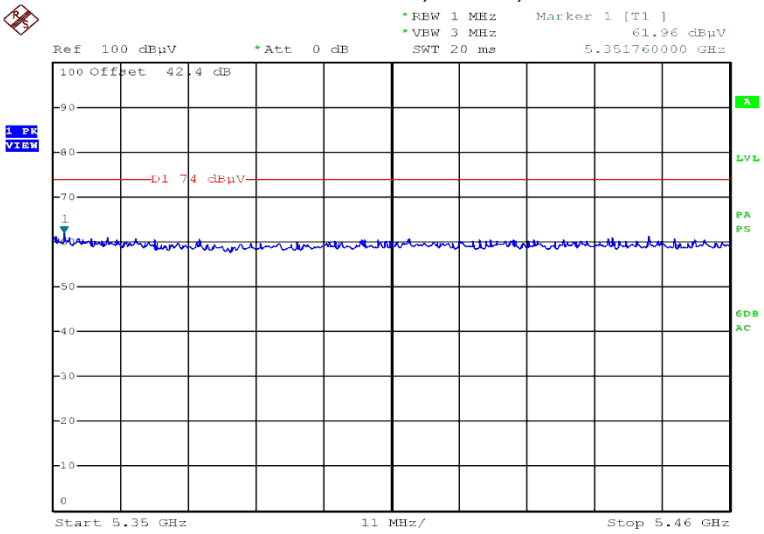
HIGH CHANNEL RESTRICTED, PEAK, HORIZ



HIGH CHANNEL RESTRICTED, AVERAGE, HORIZ

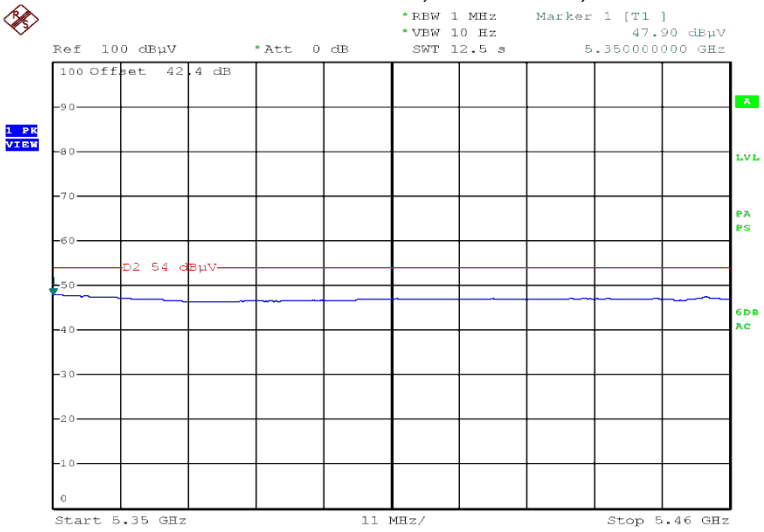


HIGH CHANNEL RESTRICTED, PEAK, VERT



Date: 14.APR.2013 13:29:13

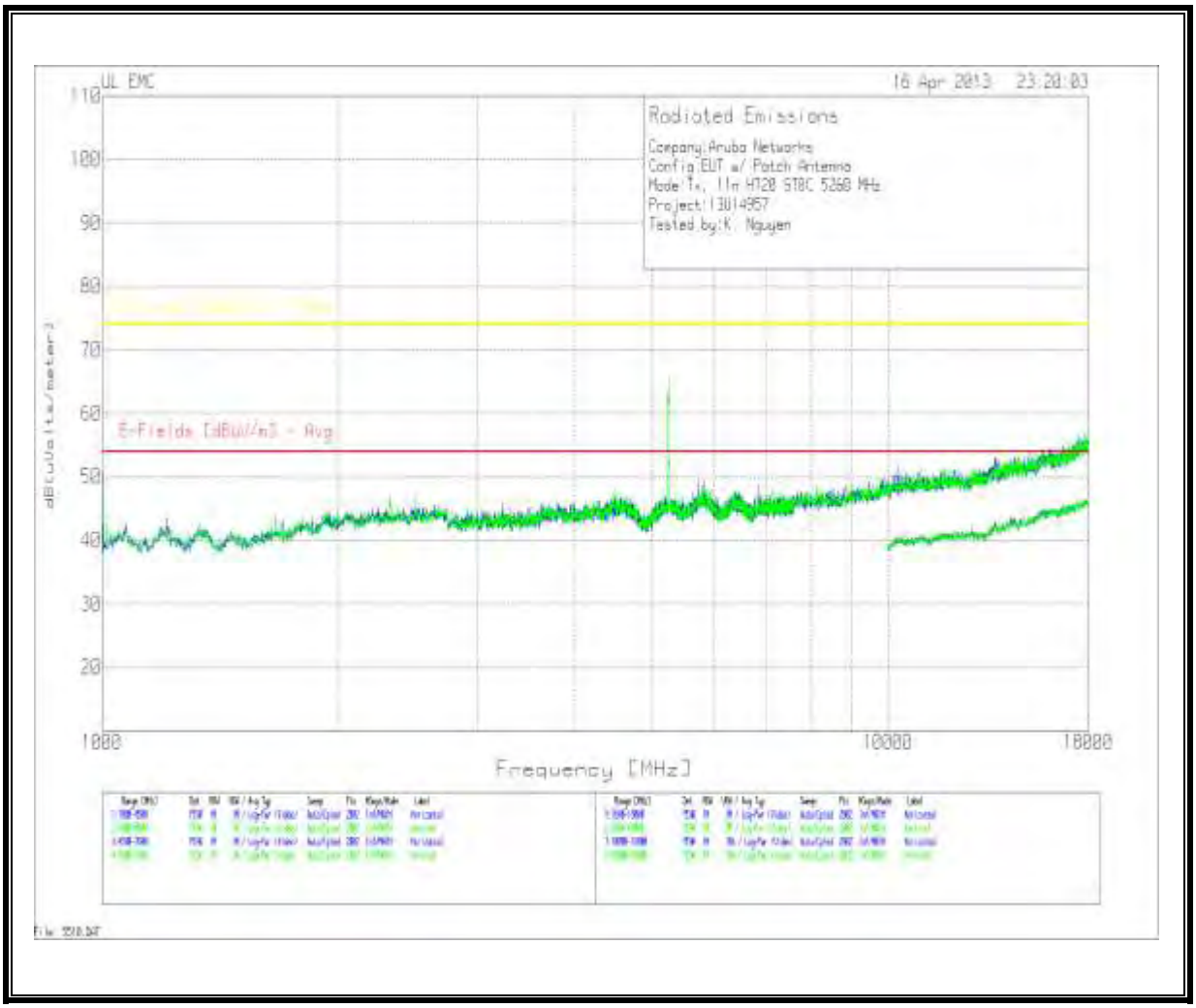
HIGH CHANNEL RESTRICTED, AVERAGE, VERT



Date: 14.APR.2013 13:28:43

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode: Tx; 11n HT20 STBC 5260 MHz
Test By:K. Nguyen

Horizontal

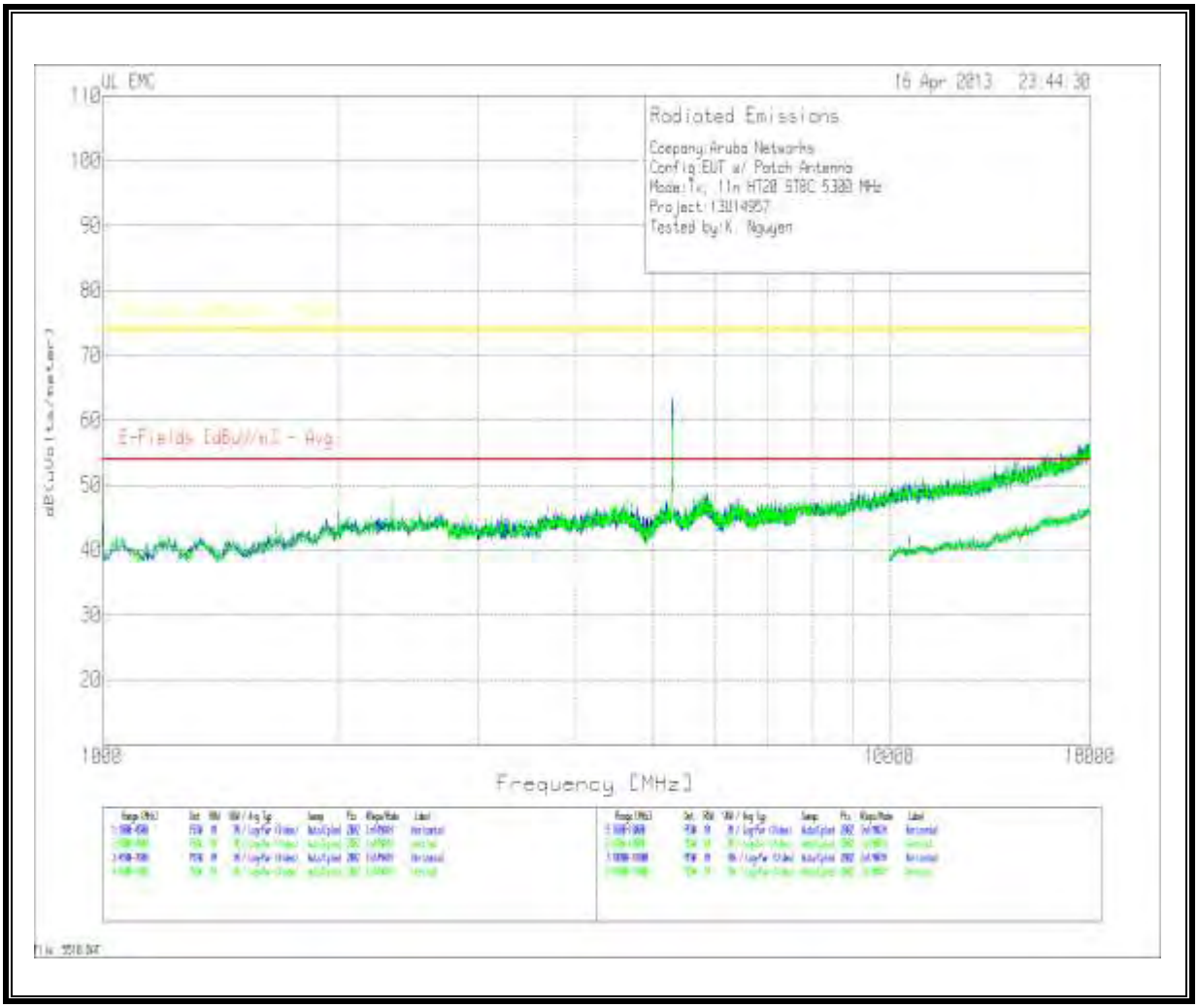
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1**	1208.146	45.4	PK	28.4	-35.4	5	0.1	43.5	54	-10.5	74	-30.5	Horz
5*	6831.584	38.94	PK	35.8	-35.1	9	0.1	48.74	-	-	68.2	-19.46	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2**	1662.919	43.72	PK	29.4	-34.8	5.6	0.1	44.02	54	-9.98	74	-29.98	Vert
3*	1997.001	43.09	PK	31.7	-34.7	5.8	0.1	45.99	-	-	68.2	-22.21	Vert
4**	2327.586	43.54	PK	32.4	-34.8	6.1	0.1	47.34	54	-6.66	74	-26.66	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode: Tx; 11n HT20 STBC 5300 MHz
Test By:K. Nguyen

Horizontal

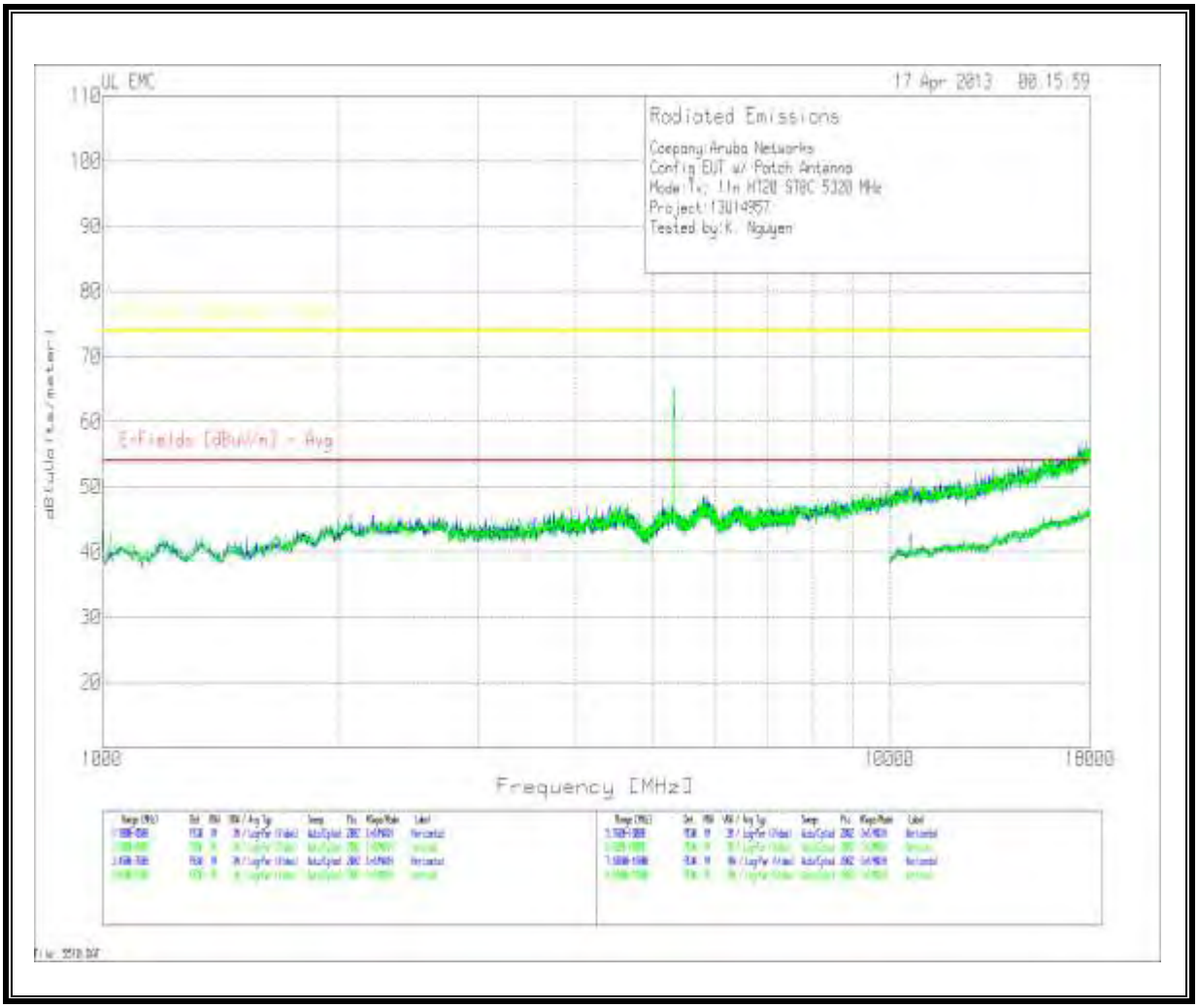
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1930.535	41.89	PK	31.2	-34.8	5.8	0.1	44.19	-	-	68.2	-24.01	Horz
6*	10599.7	28.02	PK	38.4	-35.5	10.7	0.3	41.92	-	-	68.2	-26.28	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2**	1664.668	43.91	PK	29.4	-34.8	5.6	0.1	44.21	54	-9.79	74	-29.79	Vert
3**	2332.834	44.18	PK	32.4	-34.8	6.1	0.1	47.98	54	-6.02	74	-26.02	Vert
4*	9912.844	37.93	PK	37.7	-35.8	10.5	0.2	50.53	-	-	68.2	-17.67	Vert
5*	10599.7	27.35	PK	38.4	-35.5	10.7	0.3	41.25	-	-	68.2	-26.95	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode: Tx; 11n HT20 STBC 5320 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	2059.97	41.09	PK	31.9	-34.8	5.8	0.1	44.09	-	-	68.2	-24.11	Horz
3**	10639.68	29.27	PK	38.4	-35.4	10.7	0.1	43.07	54	-10.93	74	-30.93	Horz

Vertical

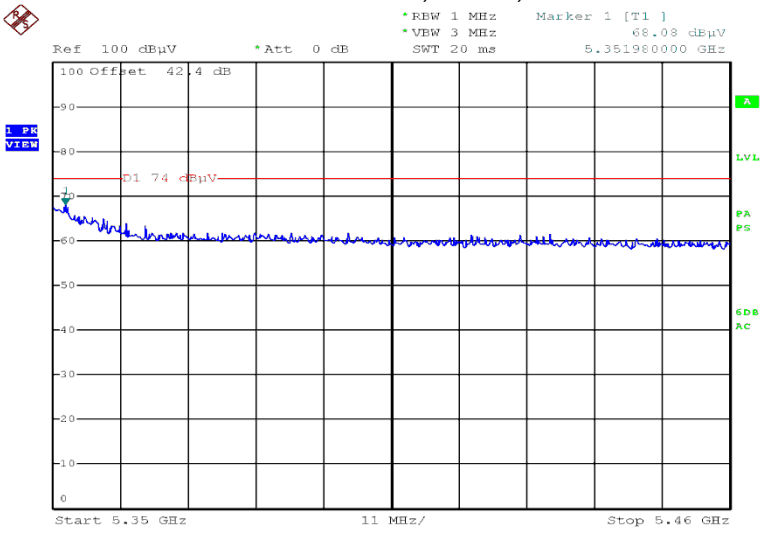
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2*	2077.461	40.49	PK	31.9	-34.8	5.9	0.1	43.59	-	-	68.2	-24.61	Vert
4**	10643.678	27.81	PK	38.4	-35.4	10.7	0.1	41.61	54	-12.39	74	-32.39	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

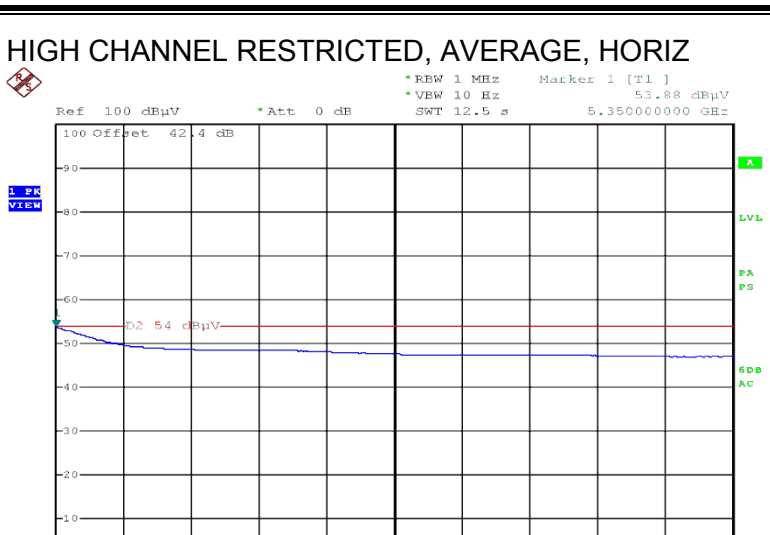
10.3.3. TX ABOVE 1 GHz 802.11n HT40 STBC 2TX MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

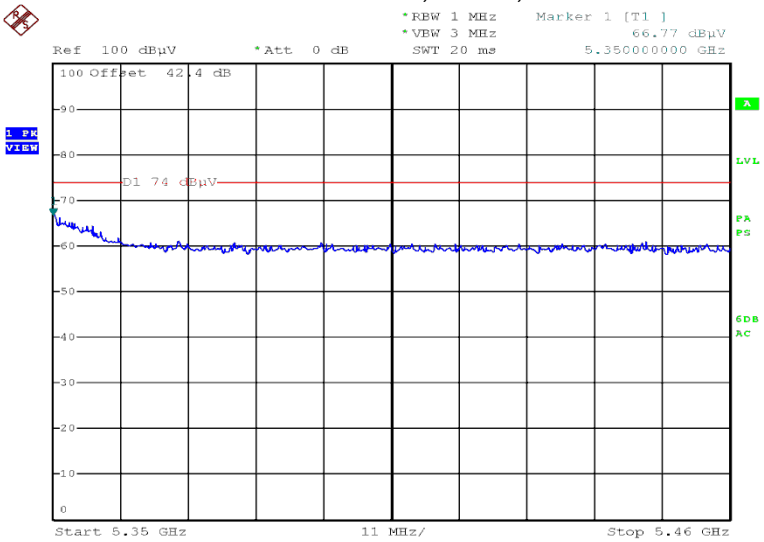
HIGH CHANNEL RESTRICTED, PEAK, HORIZ



HIGH CHANNEL RESTRICTED, AVERAGE, HORIZ

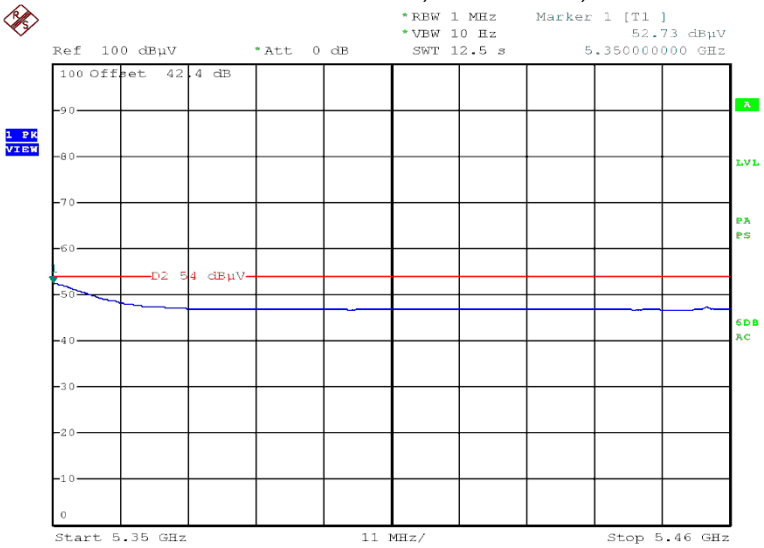


HIGH CHANNEL RESTRICTED, PEAK, VERT



Date: 14.APR.2013 13:39:53

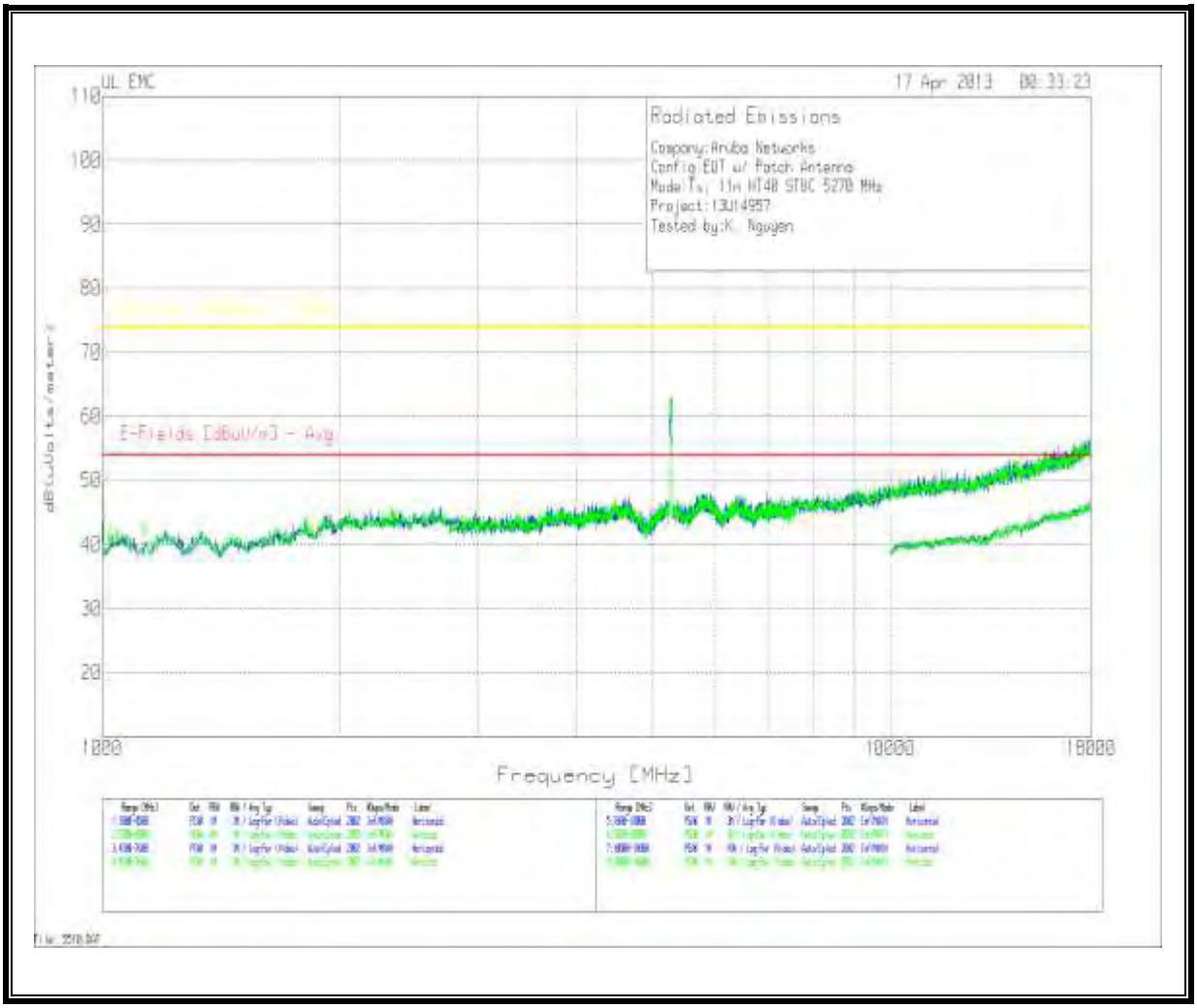
HIGH CHANNEL RESTRICTED, AVERAGE, VERT



Date: 14.APR.2013 13:39:12

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode: Tx; 11n HT40 STBC 5270 MHz
Test By:K. Nguyen

Horizontal

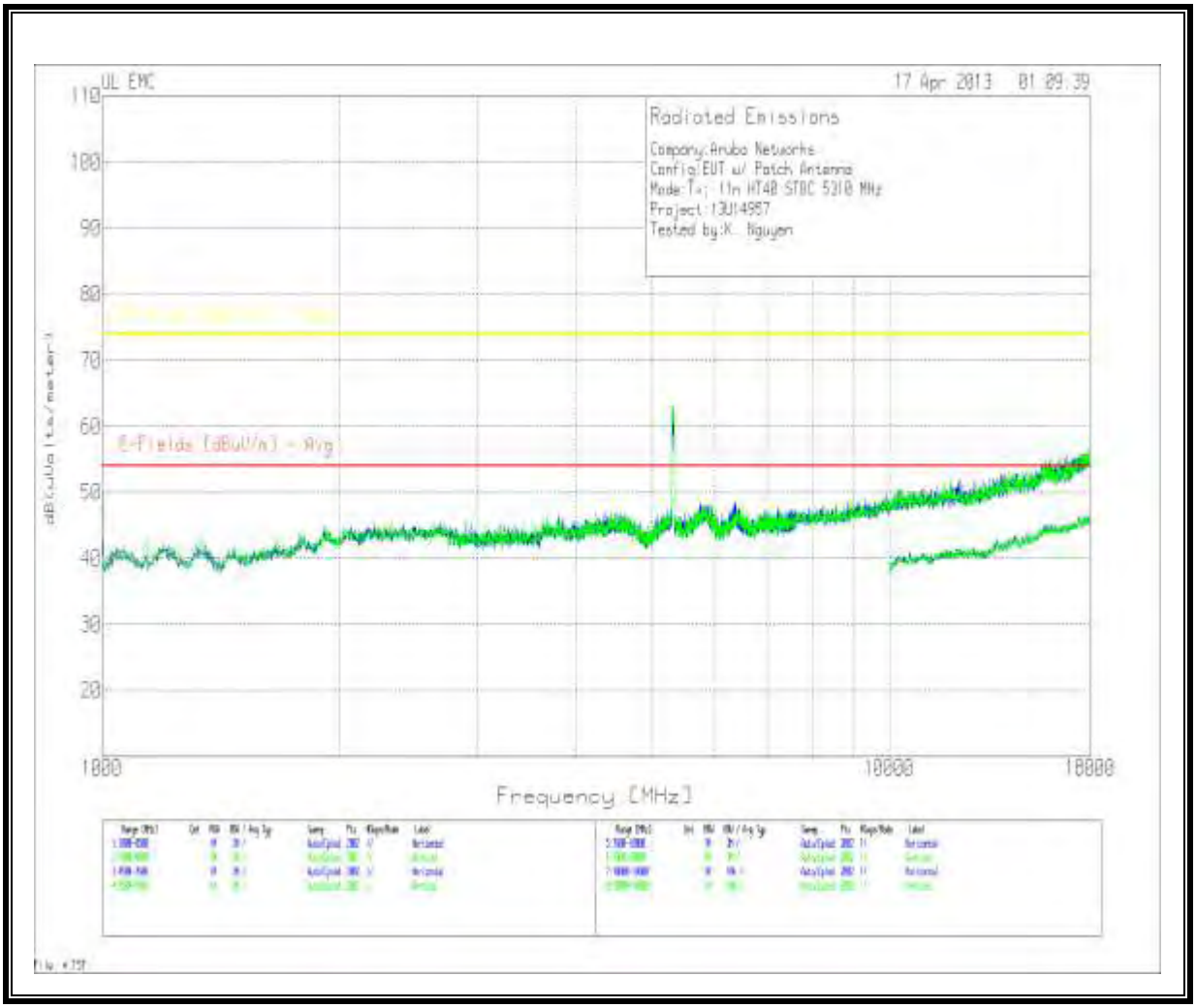
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1**	2203.398	40.94	PK	32.3	-34.8	6	0.1	44.54	54	-9.46	74	-29.46	Horz
3**	4509.295	38.36	PK	34.2	-34.9	7.7	0.1	45.46	54	-8.54	74	-28.54	Horz
5**	8296.452	36.54	PK	36	-35.5	9.6	0.2	46.84	54	-7.16	74	-27.16	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2**	2324.088	42.5	PK	32.4	-34.8	6.1	0.1	46.3	54	-7.7	74	-27.7	Vert
4**	4507.746	39.24	PK	34.2	-34.9	7.7	0.1	46.34	54	-7.66	74	-27.66	Vert
6	8327.636	37.72	PK	36.1	-35.4	9.7	0.3	48.42	-	-	74	-25.58	Vert
6A	8327.636	29.36	VB1	36.1	-35.4	9.7	0.3	40.06	54	-13.94	-	-	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

High Channel



Company:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11n HT40 STBC 5310 MHz
Project:13U14957
Tested by:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1801.099	41.94	PK	30.3	-34.8	5.6	0.1	43.14	-	-	68.2	-25.06	Horz
2*	2966.017	39.25	PK	33.1	-35.1	6.6	0.1	43.95	-	-	68.2	-24.25	Horz
3*	6379.21	38.82	PK	35.9	-35.1	8.8	0.2	48.62	-	-	68.2	-19.58	Horz

Vertical

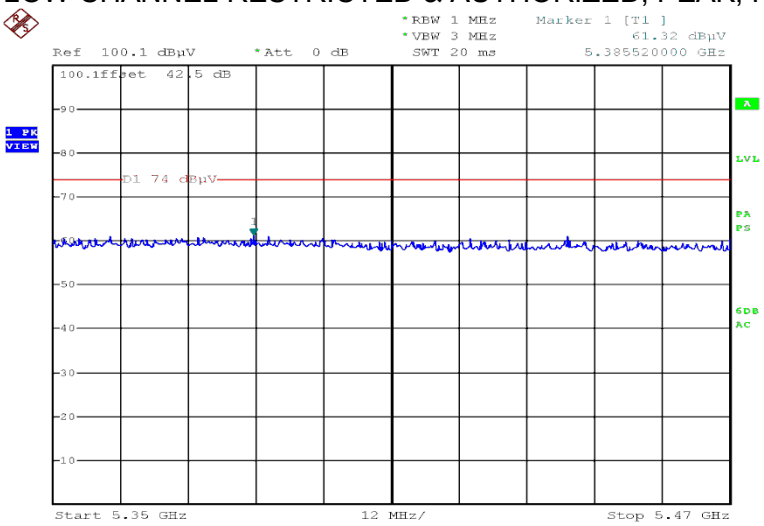
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
4*	5915.992	39.03	PK	35.6	-34.9	8.5	0.6	48.83	-	-	68.2	-19.37	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

10.3.4. TX ABOVE 1 GHz 802.11a CDD 2TX MODE IN THE 5.6 GHz BAND

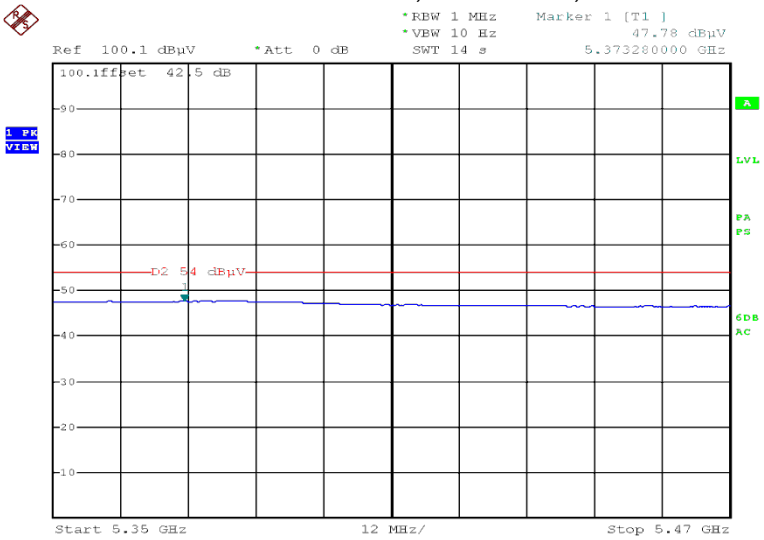
RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)

LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, HORIZ



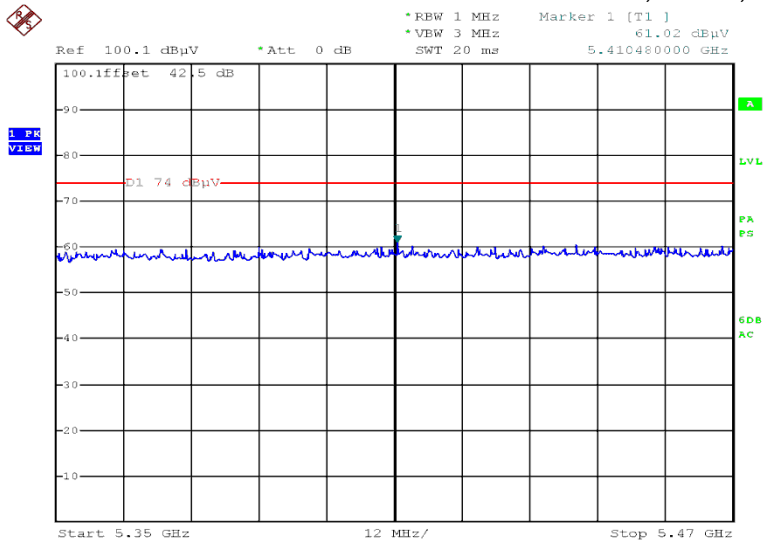
Date: 14.APR.2013 14:22:15

LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



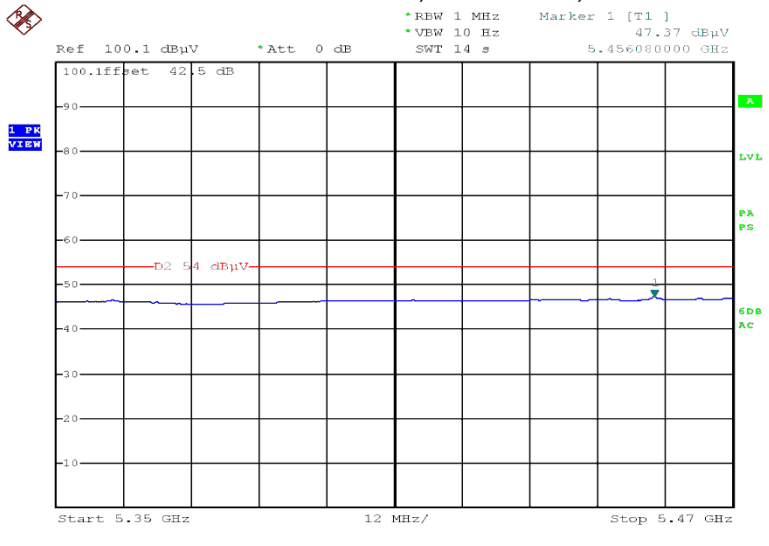
Date: 14.APR.2013 14:21:49

LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, VERT



Date: 14.APR.2013 14:19:49

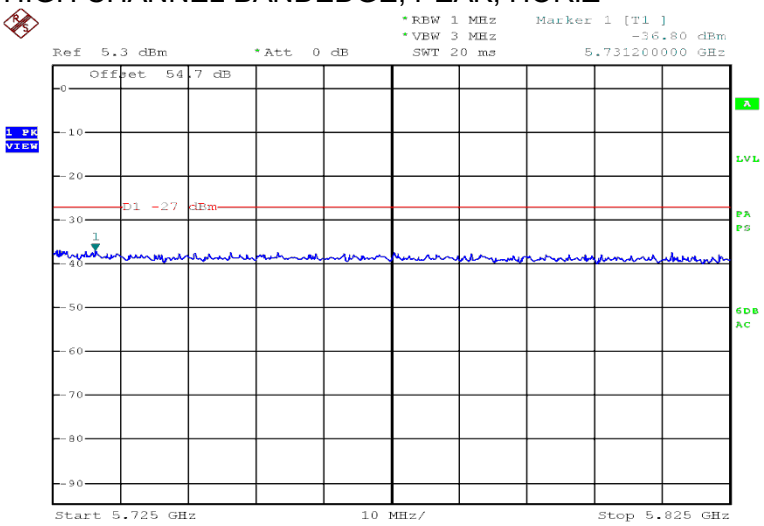
LOW CHANNEL RESTRICTED, AVERAGE, VERT



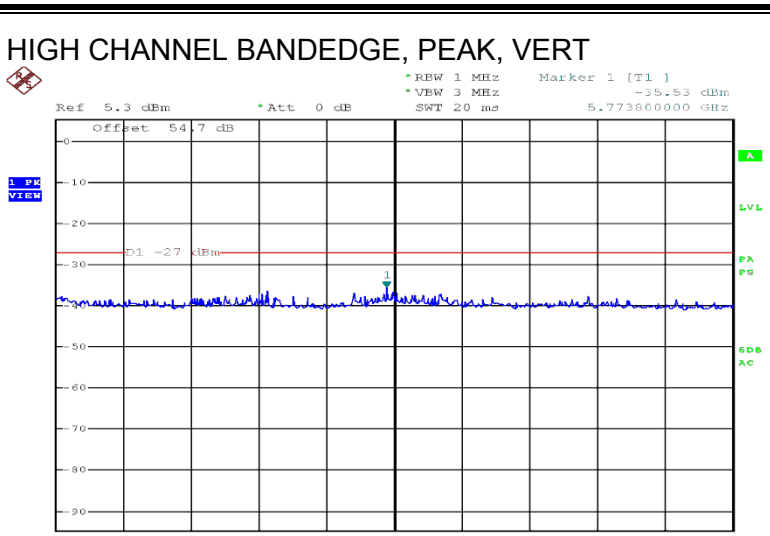
Date: 14.APR.2013 14:19:26

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL BANDEDGE, PEAK, HORIZ

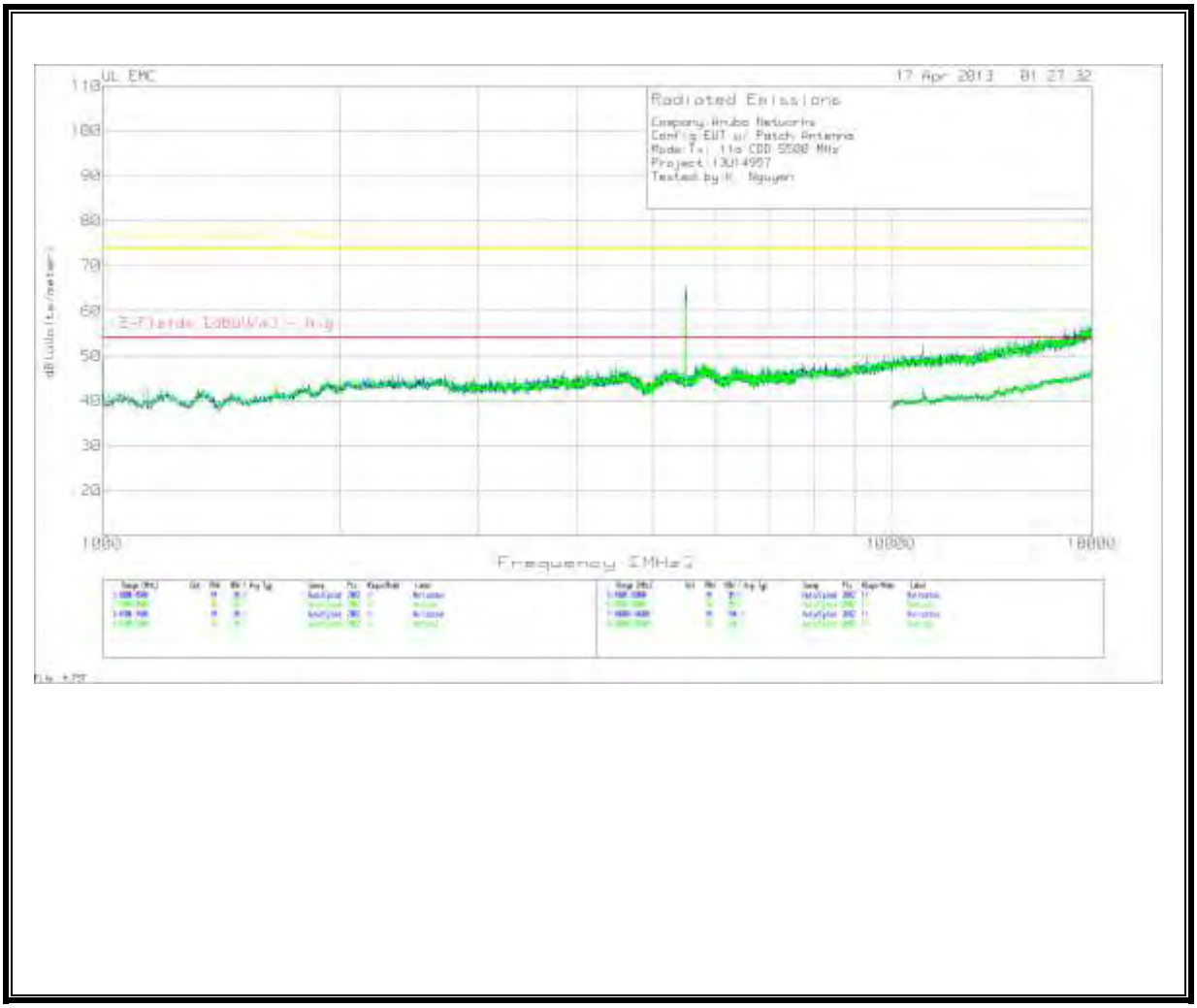


HIGH CHANNEL BANDEDGE, PEAK, VERT



HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11a CDD 5500 MHz
Test By:K. Nguyen

Horizontal

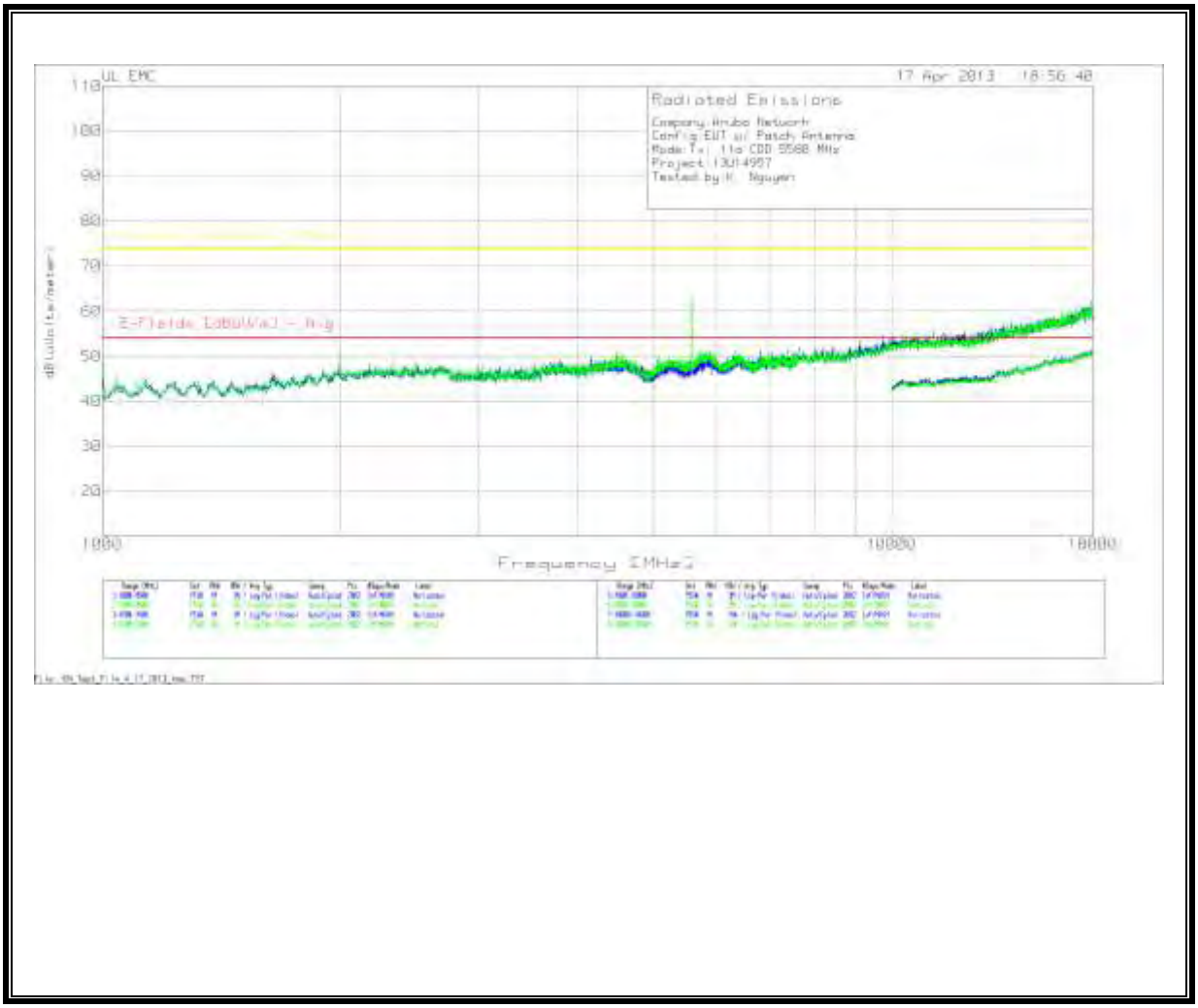
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	2196.402	41.14	PK	32.2	-34.8	6	0.1	44.64	-	-	68.2	-23.56	Horz
2**	10999.5	29.46	PK	38.4	-35.2	10.8	0.3	43.76	54	-10.24	74	-30.24	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3**	1664.668	43.68	PK	29.4	-34.8	5.6	0.1	43.98	54	-10.02	74	-30.02	Vert
4*	4473.763	41.78	PK	34.2	-34.9	7.7	0.3	49.08	-	-	68.2	-19.12	Vert
5**	10999.5	29.38	PK	38.4	-35.2	10.8	0.3	43.68	54	-10.32	74	-30.32	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11a CDD 5580 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1995.252	42.33	PK	31.7	-34.7	8.1	0.1	47.53	-	-	68.2	-20.67	Horz

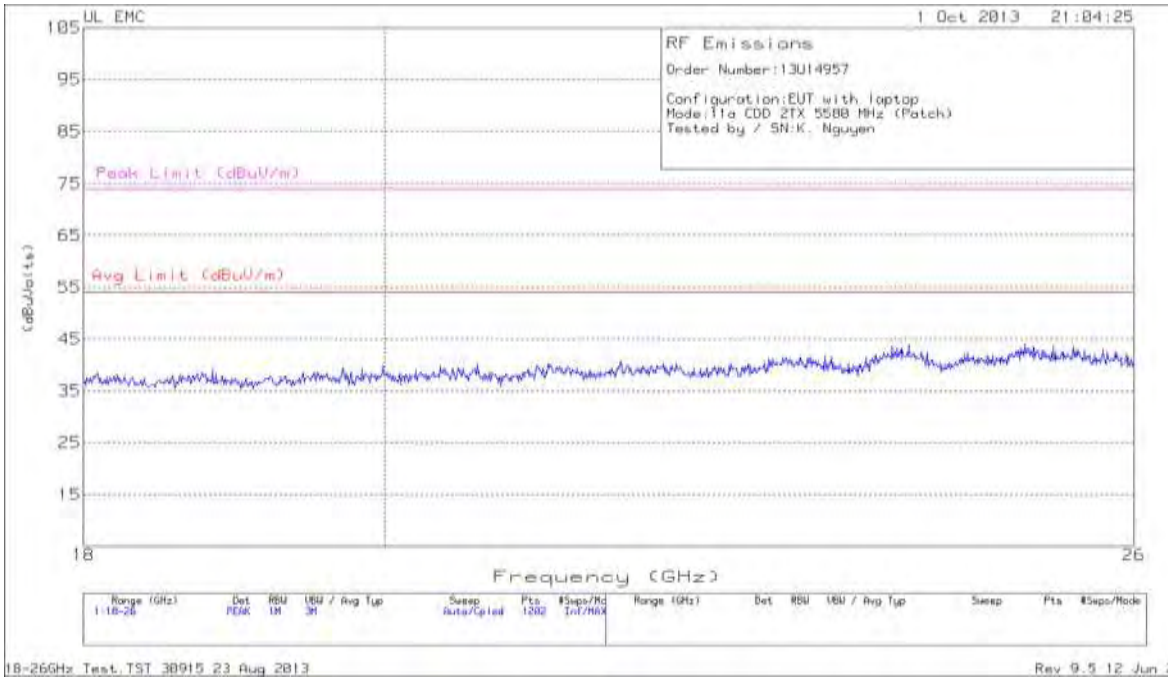
Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2*	1995.252	45.97	PK	31.7	-34.7	8.1	0.1	51.17	-	-	68.2	-17.03	Vert
3	2329.335	42.95	PK	32.4	-34.8	8.4	0.1	49.05	-	-	74	-24.95	Vert
	2329.335	31.71	VB1	32.4	-34.8	8.5	0.1	37.91	54	-16.09	-	-	Vert
4*	4477.261	41.45	PK	34.2	-35	10.3	0.3	51.25	-	-	68.2	-16.95	Vert
5*	6802.149	38.56	PK	35.7	-35.1	12	0.2	51.36	-	-	68.2	-16.84	Vert

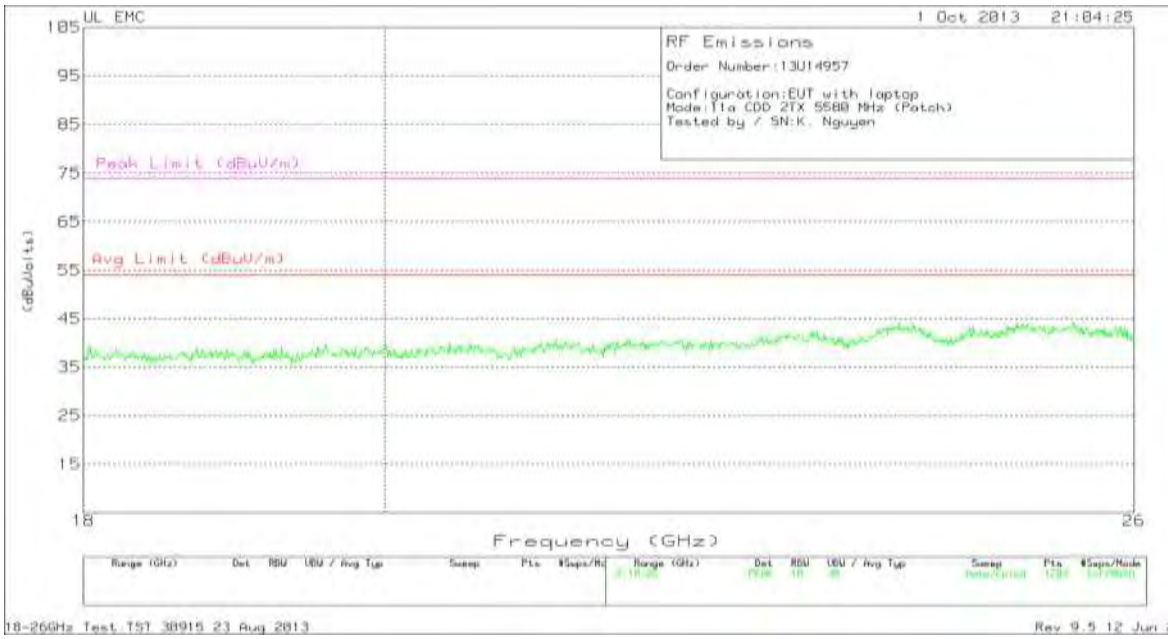
PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

18-26 GHz

Horizontal



Vertical



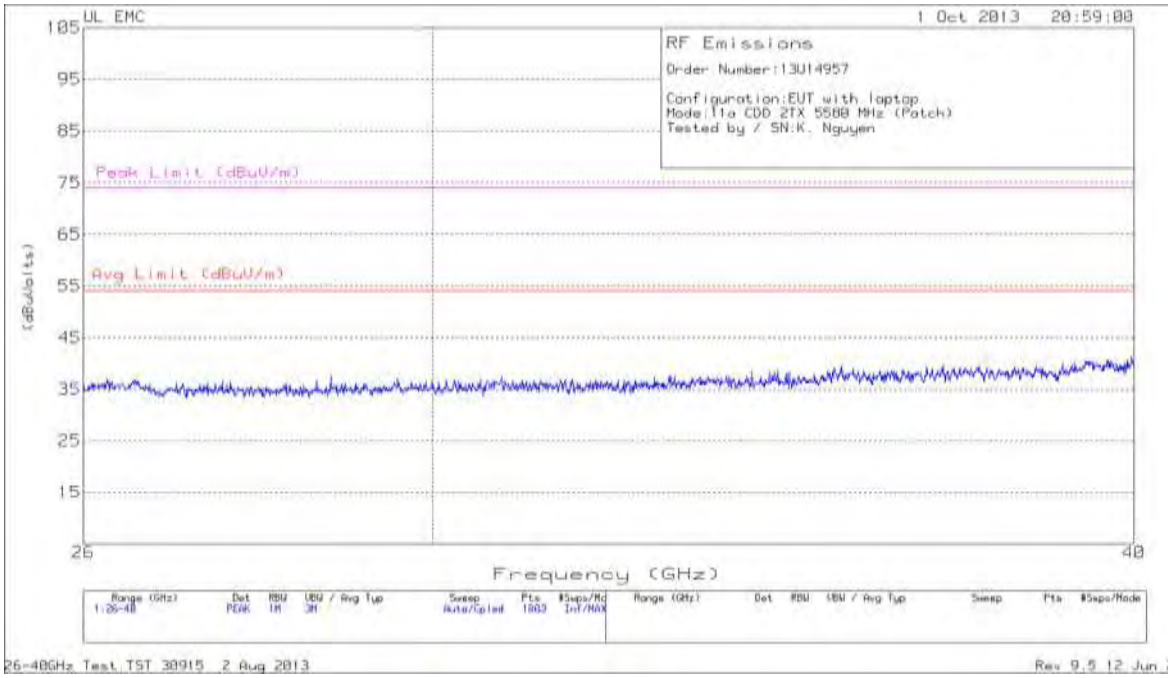
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Avg Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	23.888	42.37	PK	33.5	-22.7	-9.5	43.67	54	-10.33	74	-30.33
4	25.454	41.87	PK	33.8	-22.5	-9.5	43.67	54	-10.33	74	-30.33
2	23.948	43.33	PK	33.3	-22.8	-9.5	44.33	54	-9.67	74	-29.67
3	25.46	42.37	PK	33.8	-22.5	-9.5	44.17	54	-9.83	74	-29.83

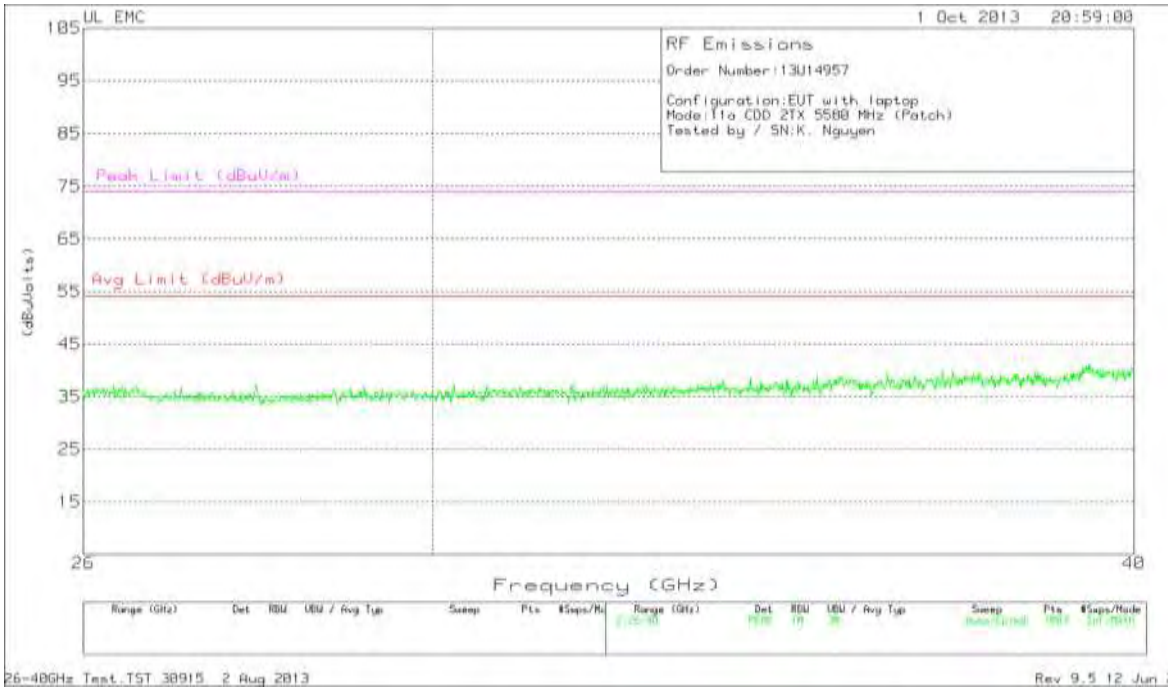
PK - Peak detector

26-40 GHz

Horizontal



Vertical

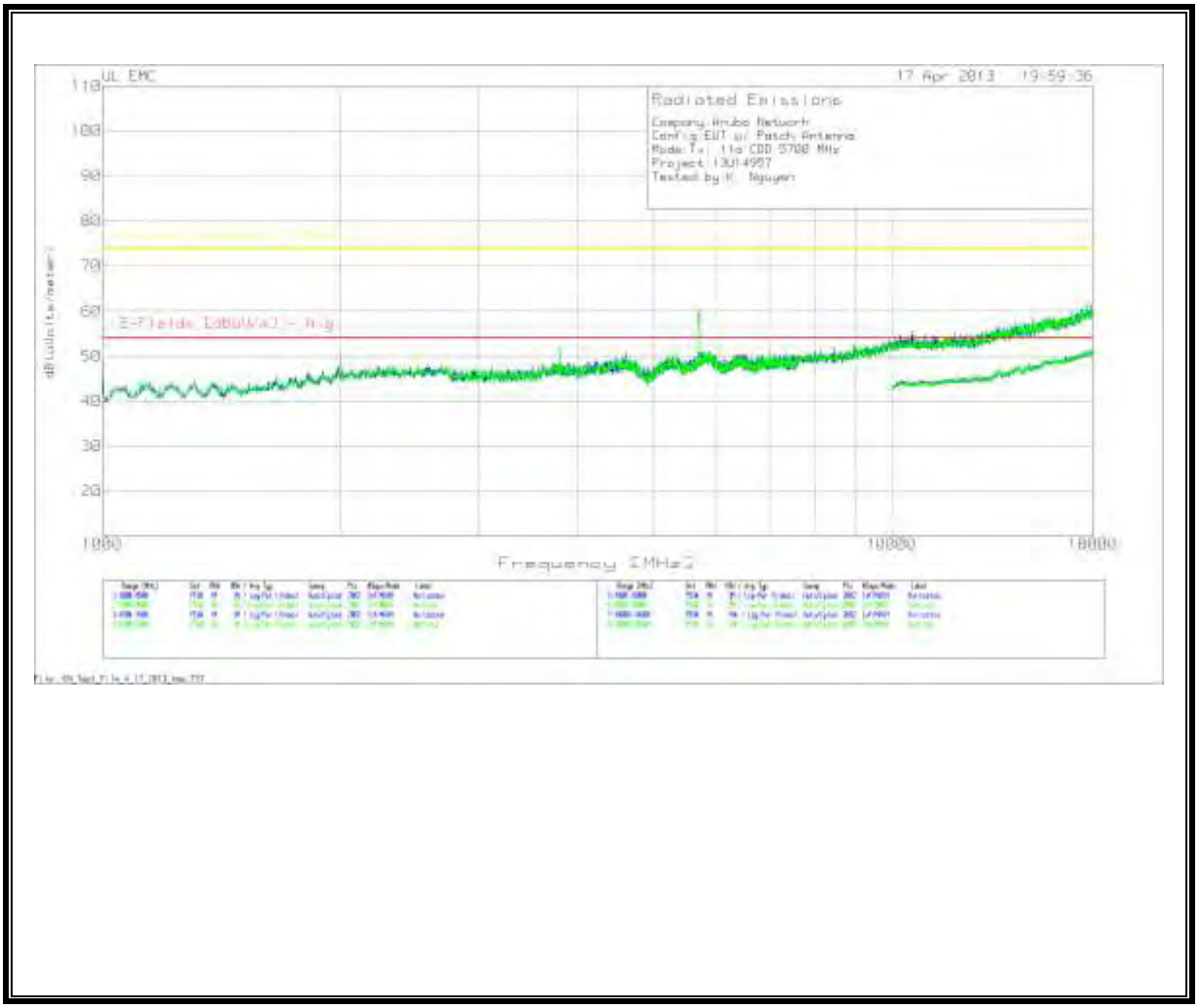


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Avg Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	28.774	46.27	PK	35.7	-34.8	-9.5	37.67	54	-16.33	74	-36.33
2	39.262	47.63	PK	38.6	-36.4	-9.5	40.33	54	-13.67	74	-33.67
3	27.903	45.63	PK	35.8	-34.6	-9.5	37.33	54	-16.67	74	-36.67
4	36.978	50.23	PK	37.2	-37.6	-9.5	40.33	54	-13.67	74	-33.67

PK - Peak detector

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11a CDD 5700 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1993.503	42.44	PK	31.7	-34.7	8.1	0.1	47.64	-	-	68.2	-20.56	Horz

Vertical

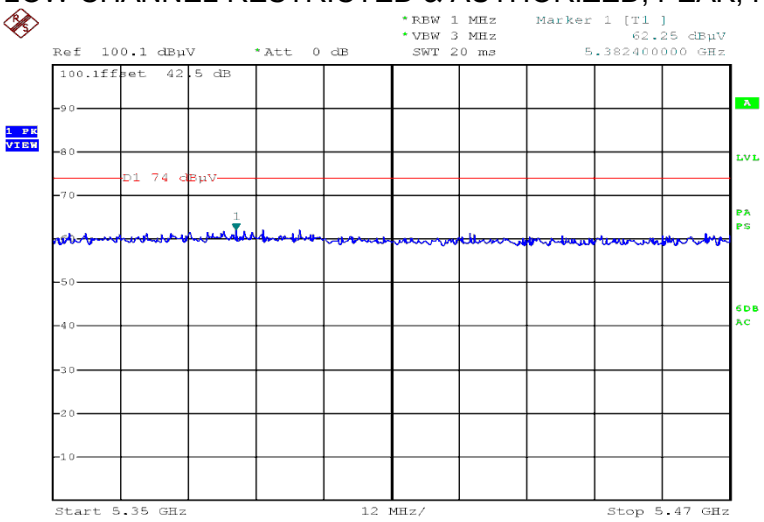
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2*	2000.5	45.53	PK	31.7	-34.7	8.1	0.1	50.73	-	-	68.2	-17.47	Vert
3	3802.099	43.18	PK	33.8	-35	9.8	0.2	51.98	-	-	74	-22.02	Vert
	3802.099	39.22	VB1	33.8	-35	9.8	0.2	48.02	54	-5.98	-	-	Vert
4*	7006.647	38.67	PK	35.9	-35.3	12.2	0.1	51.57	-	-	68.2	-16.63	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

10.3.5. TX ABOVE 1 GHz 802.11n HT20 STBC MODE IN THE 5.6 GHz BAND

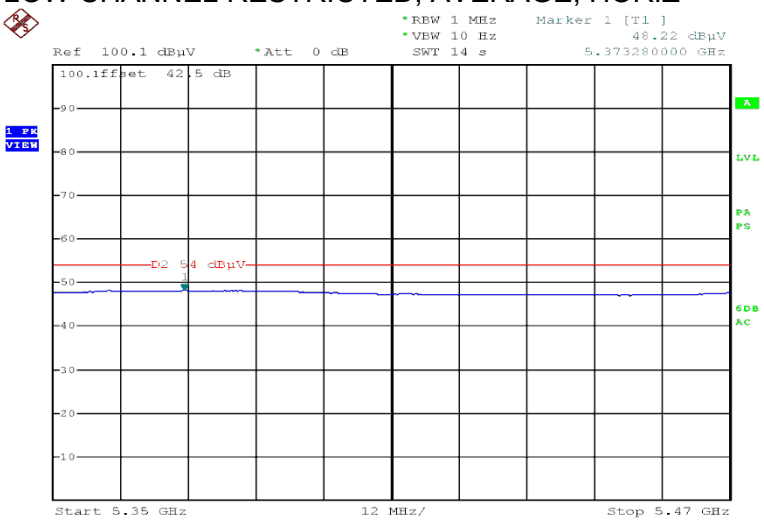
RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)

LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, HORIZ



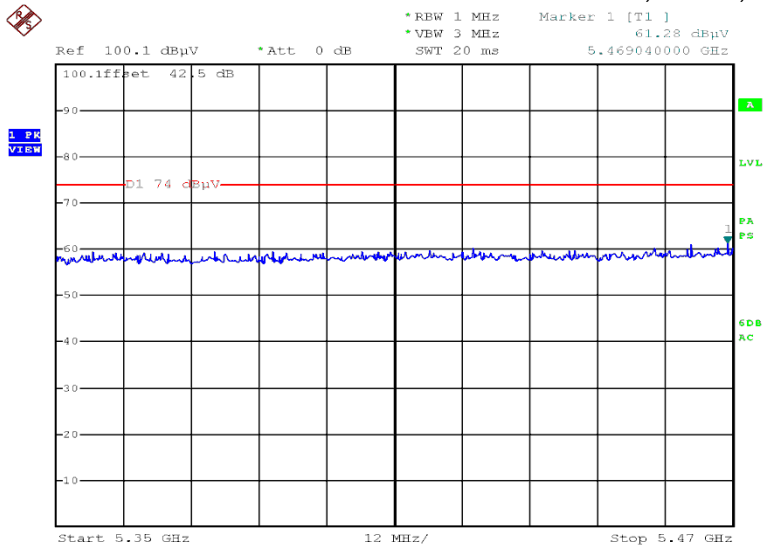
Date: 14.APR.2013 14:26:13

LOW CHANNEL RESTRICTED, AVERAGE, HORIZ



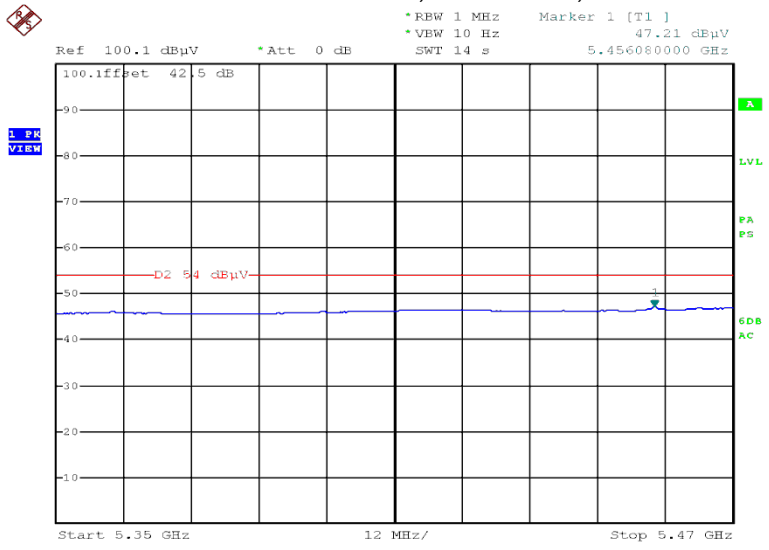
Date: 14.APR.2013 14:27:09

LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, VERT



Date: 14.APR.2013 14:29:58

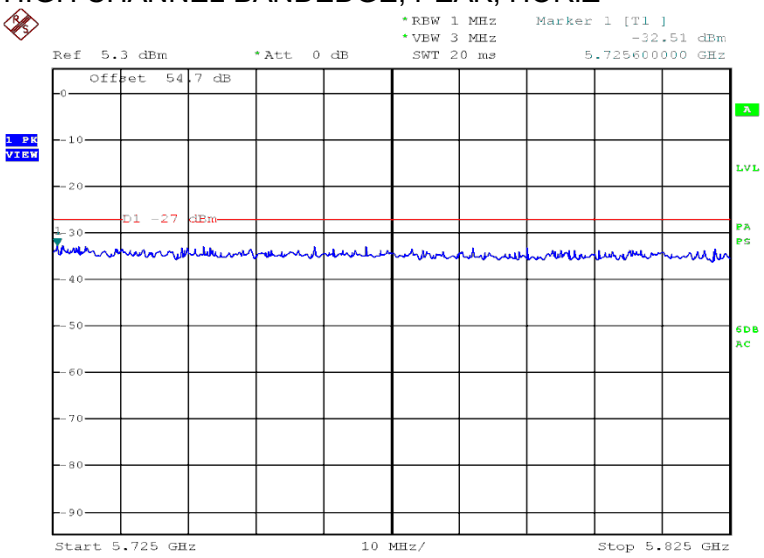
LOW CHANNEL RESTRICTED, AVERAGE, VERT



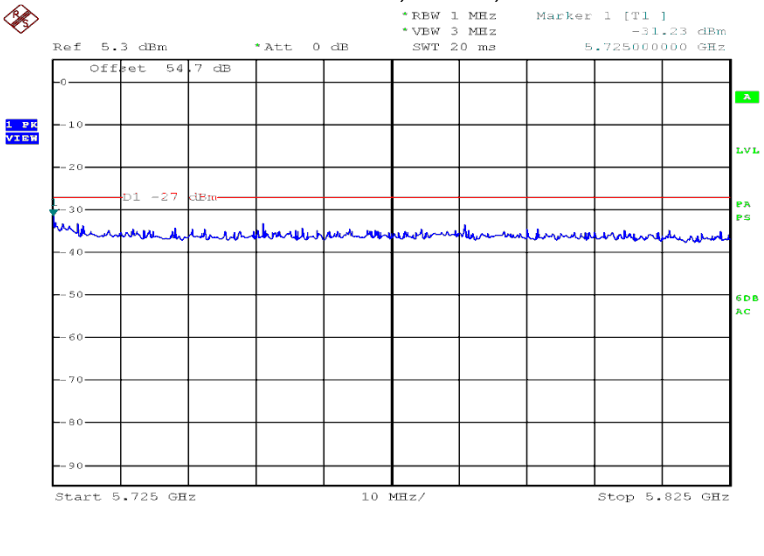
Date: 14.APR.2013 14:28:07

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL BANDEDGE, PEAK, HORIZ

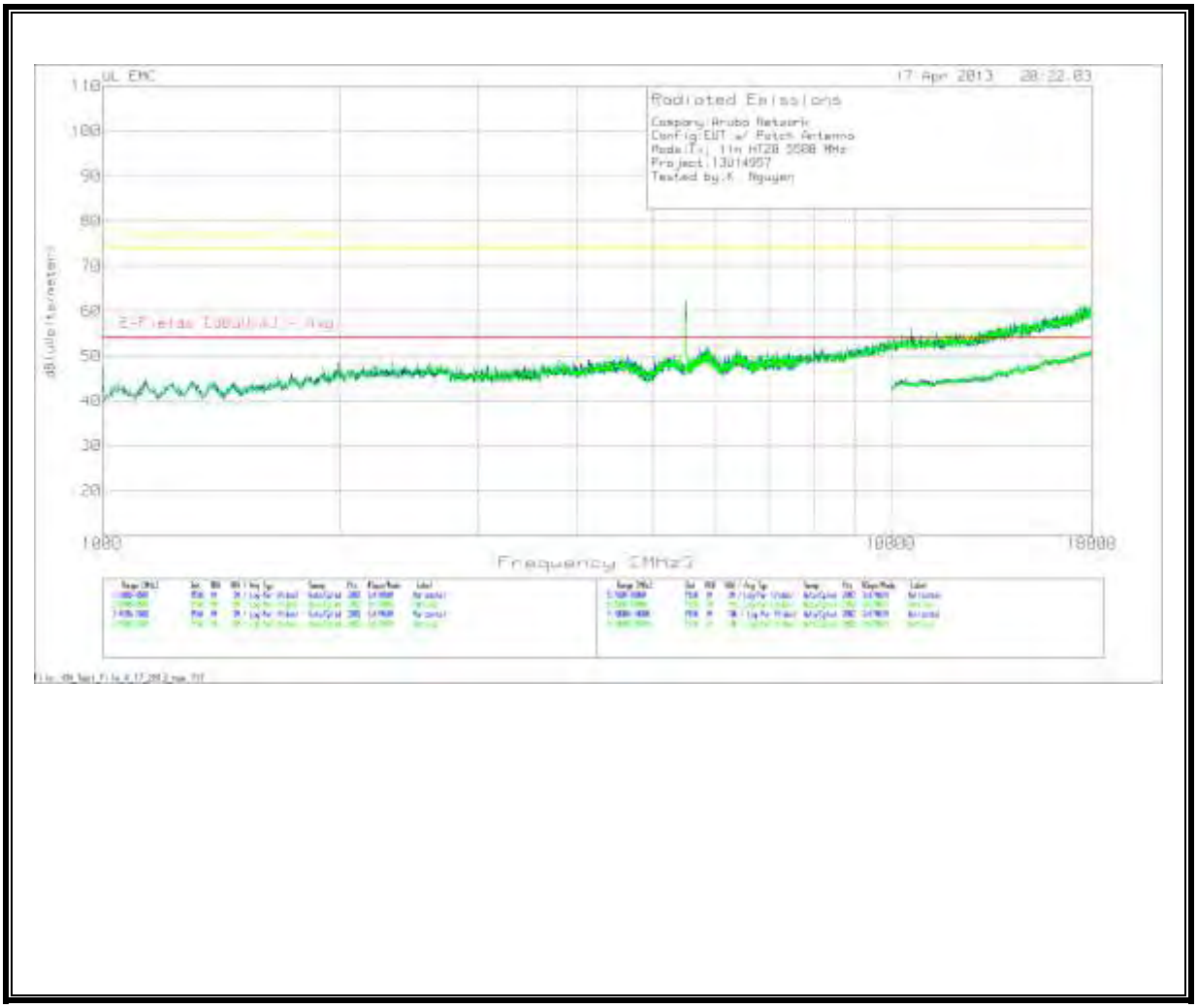


HIGH CHANNEL BANDEDGE, PEAK, VERT



HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11n HT20 STBC 5500 MHz
Test By:K. Nguyen

Horizontal

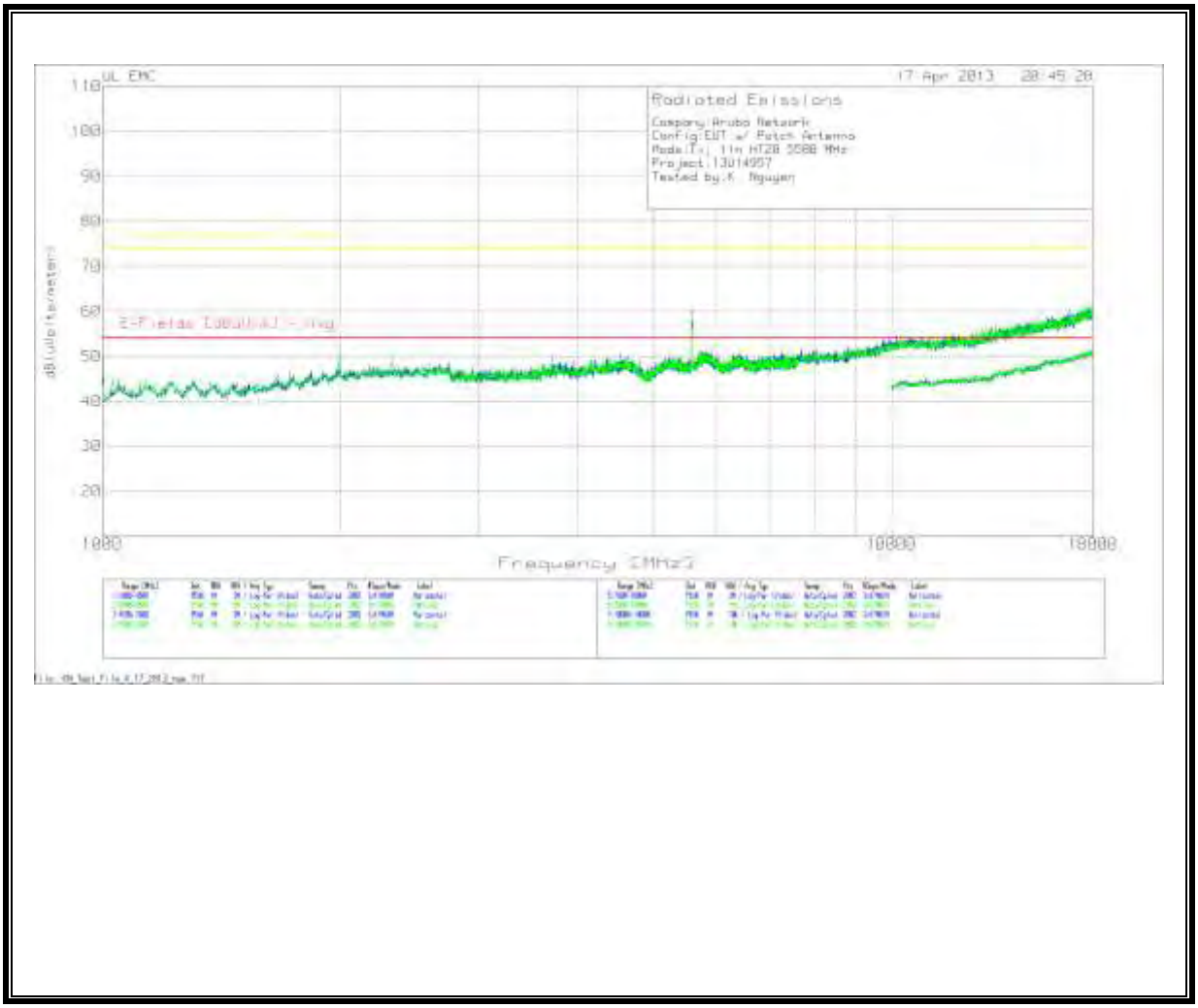
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1738.131	42.96	PK	29.9	-34.7	7.8	0.1	46.06	-	-	68.2	-22.14	Horz
2*	2976.512	38.98	PK	33.1	-35	9.2	0.2	46.48	-	-	68.2	-21.72	Horz
3*	5863.318	38.7	PK	35.5	-34.9	11.4	1	51.7	-	-	68.2	-16.5	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
4*	1997.001	43.87	PK	31.7	-34.7	8.1	0.1	49.07	-	-	68.2	-19.13	Vert
5*	5823.038	39.68	PK	35.4	-34.9	11.4	1	52.58	-	-	68.2	-15.62	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11n HT20 STBC 5580 MHz
Test By:K. Nguyen

Horizontal

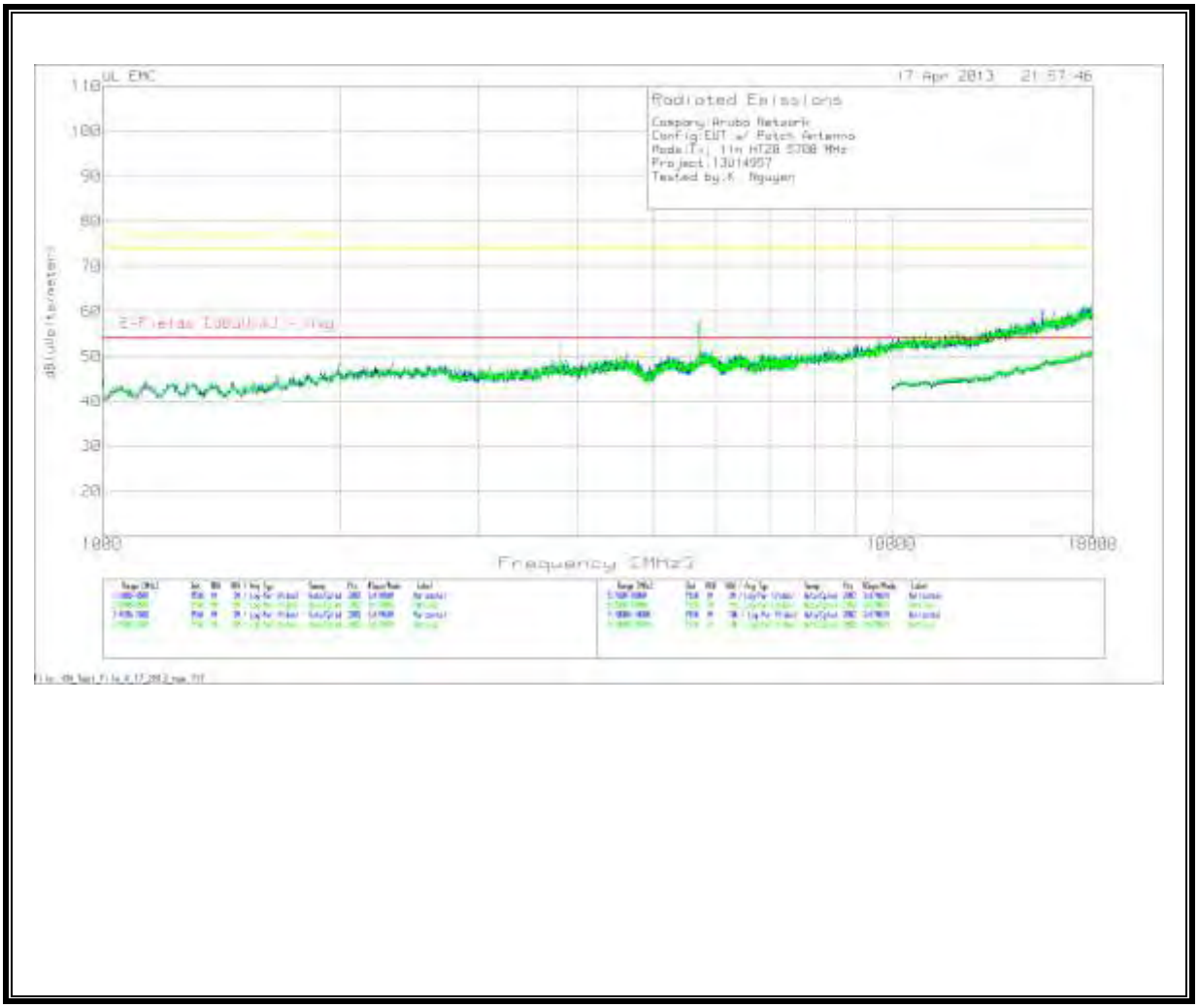
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
4	7677.961	37.99	PK	36	-35.5	12.6	0.6	51.69	-	-	74	-22.31	Horz
4A	7677.961	26.45	VB1	36.1	-35.5	12.5	0.5	40.05	54	-13.95	-	-	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1**	1666.417	43.85	PK	29.4	-34.8	7.7	0.1	46.25	54	-7.75	74	-27.75	Vert
2*	1993.503	46.5	PK	31.7	-34.7	8.1	0.1	51.7	-	-	68.2	-16.5	Vert
3	2327.586	43.43	PK	32.4	-34.8	8.4	0.1	49.53	-	-	74	-24.47	Vert
3A	2327.586	30.82	VB1	32.4	-34.8	8.4	0.1	36.92	54	-17.08	-	-	Vert
5	7494.653	38.11	PK	35.9	-35.4	12.5	0.2	51.31	-	-	74	-22.69	Vert
5A	7494.653	26.05	VB1	35.9	-35.4	12.5	0.2	39.25	54	-14.75	-	-	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11n HT20 STBC 5700 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1991.754	41.96	PK	31.6	-34.7	8.1	0.1	47.06	-	-	68.2	-21.14	Horz
2	7631.184	35.45	PK	36	-35.3	12.5	0.3	48.95	-	-	74	-25.05	Horz
	7631.184	26.38	VB1	36	-35.4	12.5	0.4	39.88	54	-14.12	-	-	Horz

Vertical

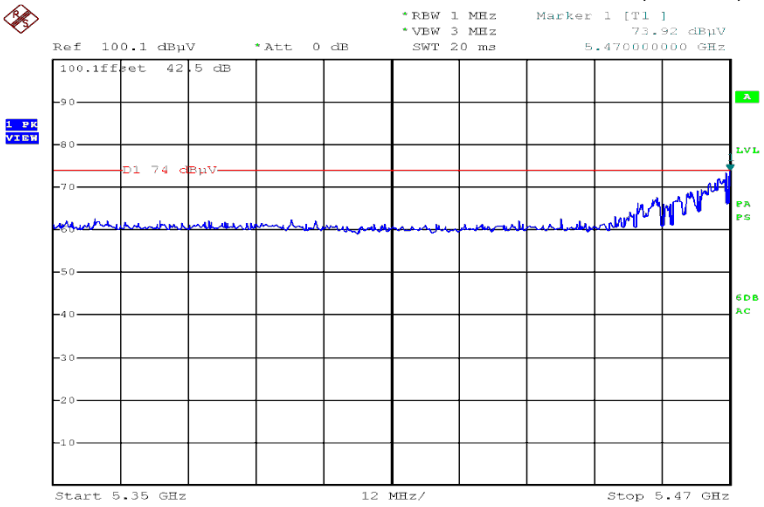
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3*	1997.876	43.84	PK	31.7	-34.7	8.1	0.1	49.04	-	-	68.2	-19.16	Vert
4	3800.35	44.24	PK	33.8	-35	9.8	0.2	53.04	-	-	74	-20.96	Vert
	3800.35	38.04	VB1	33.8	-35	9.8	0.2	46.84	54	-7.16	-	-	Vert
5*	4480.76	41.38	PK	34.2	-35	10.3	0.3	51.18	-	-	68.2	-17.02	Vert
6*	7906.647	38.06	PK	36	-35.5	12.7	0.3	51.56	-	-	68.2	-16.64	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

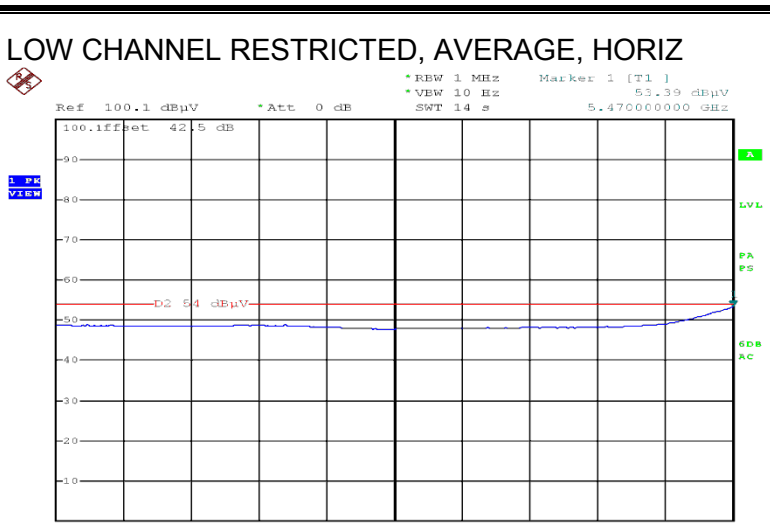
10.3.6. TX ABOVE 1 GHz 802.11n HT40 STBC MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)

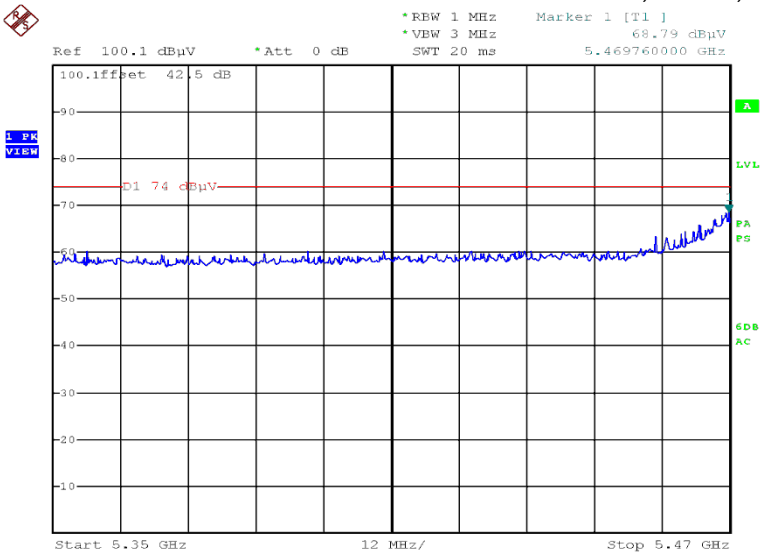
LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, HORIZ



LOW CHANNEL RESTRICTED, AVERAGE, HORIZ

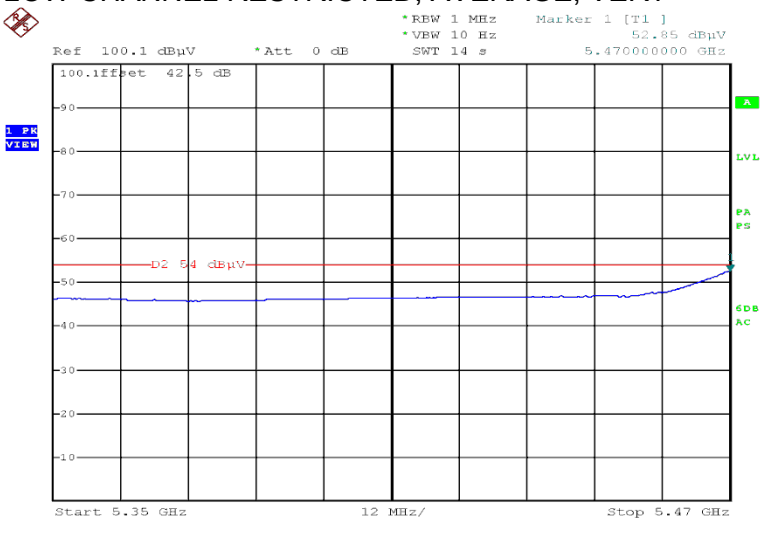


LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, VERT



Date: 14.APR.2013 13:50:35

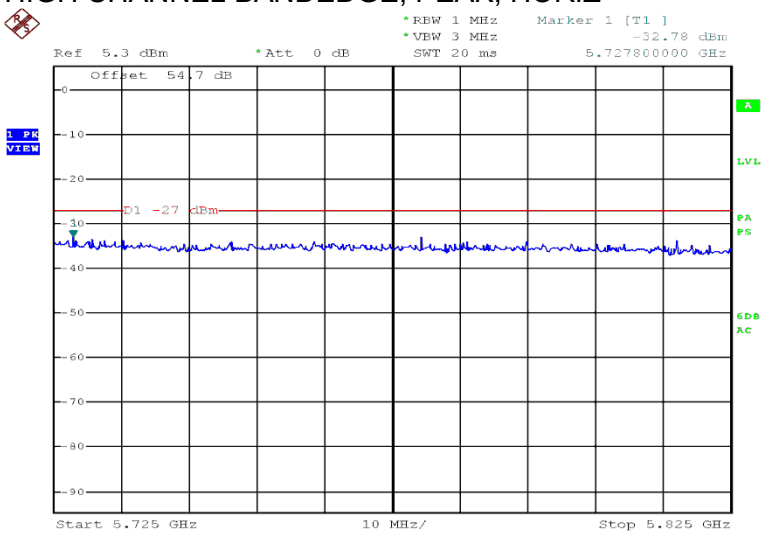
LOW CHANNEL RESTRICTED, AVERAGE, VERT



Date: 14.APR.2013 13:50:13

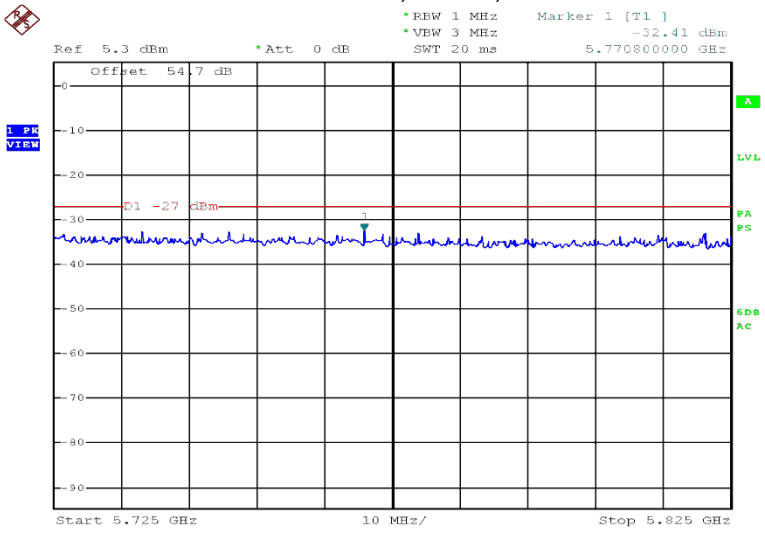
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL BANDEDGE, PEAK, HORIZ



Date: 14.APR.2013 13:56:55

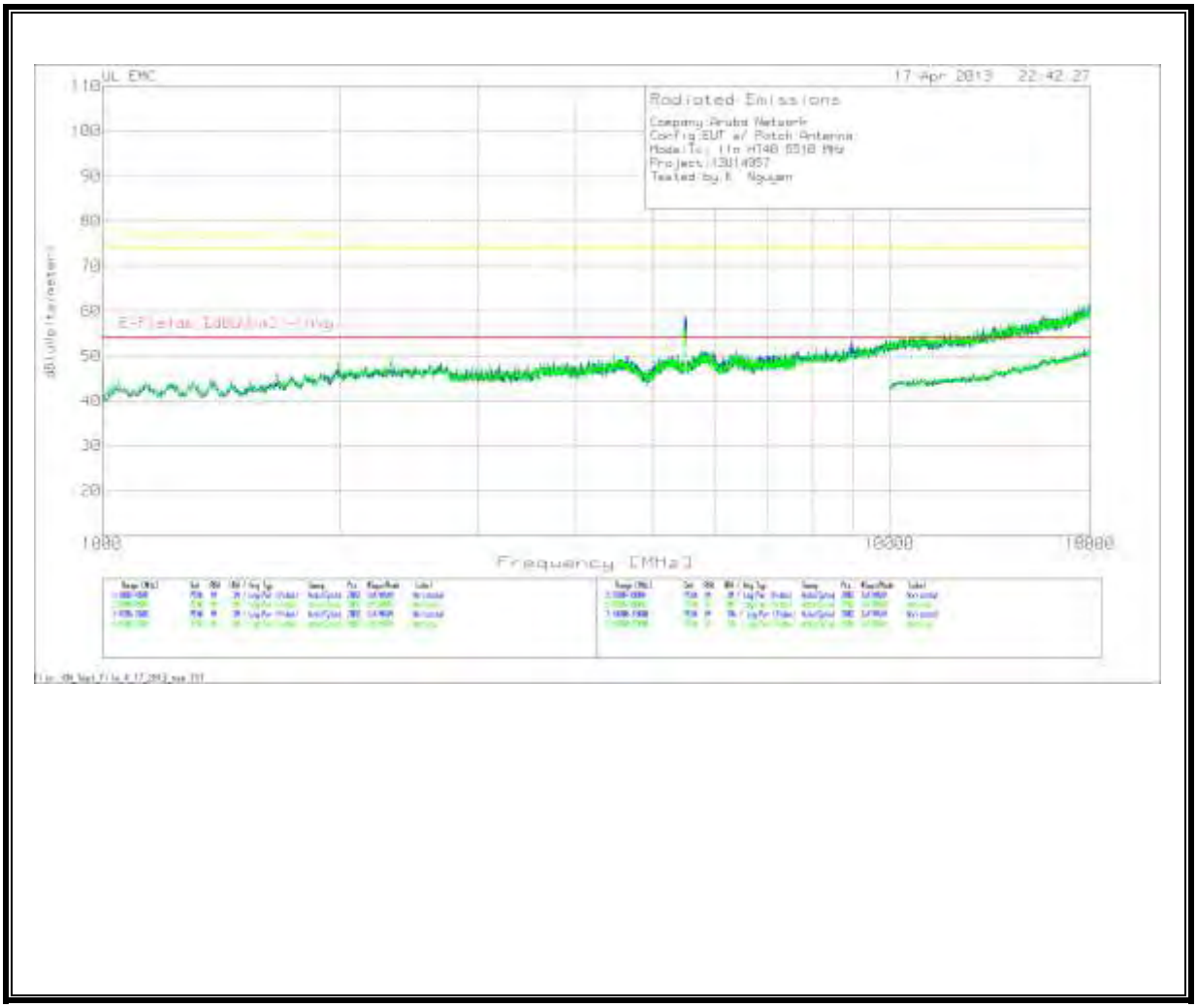
HIGH CHANNEL BANDEDGE, PEAK, VERT



Date: 14.APR.2013 13:58:41

HARMONICS AND SPURIOUS EMISSIONS

Low Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11n HT40 STBC 5510 MHz
Test By:K. Nguyen

Horizontal

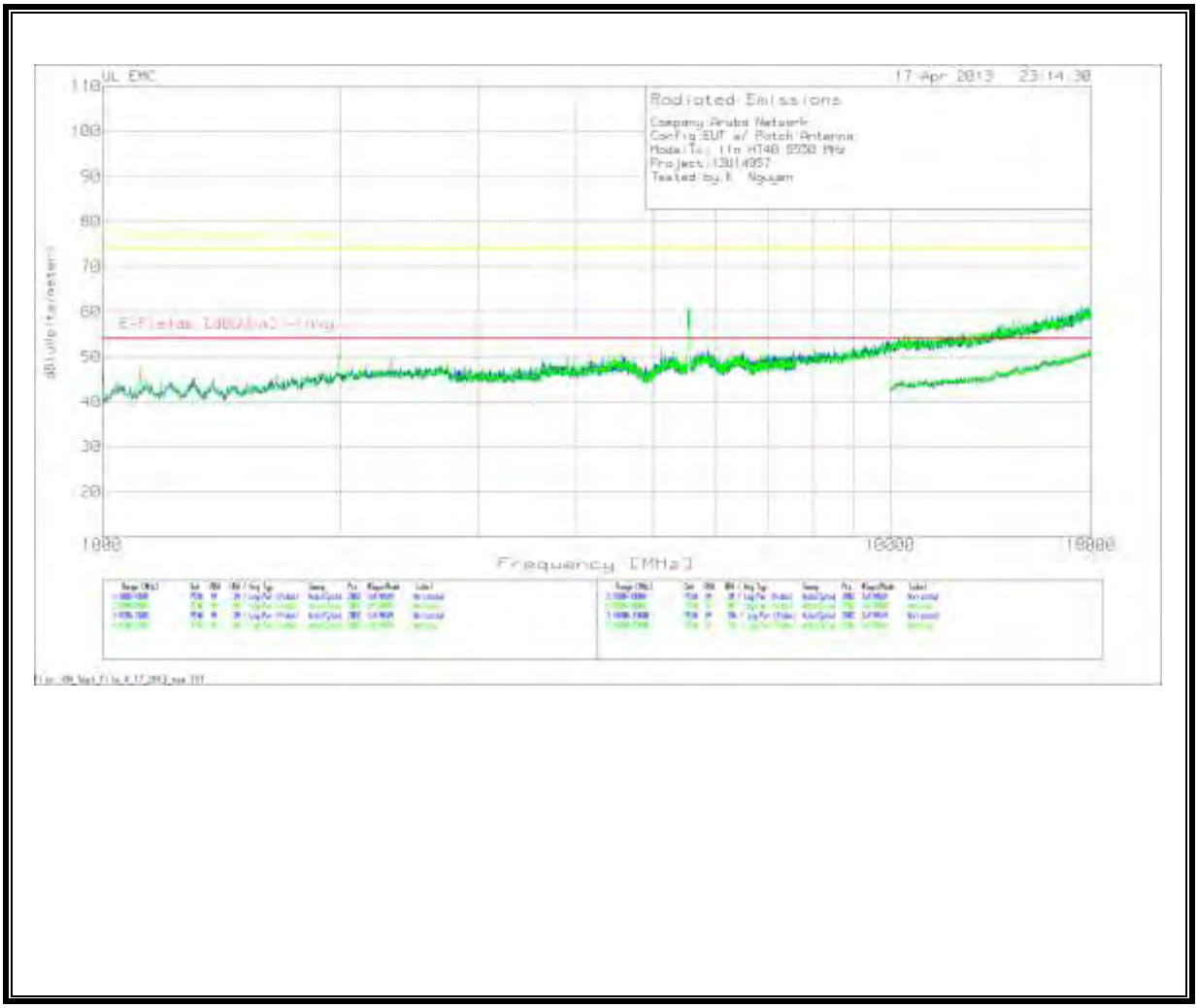
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1991.754	42.88	PK	31.6	-34.7	8.1	0.1	47.98	-	-	68.2	-20.22	Horz
2*	8951.324	38.47	PK	36.6	-35.5	13.6	0.4	53.57	-	-	68.2	-14.63	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3*	1997.001	43.96	PK	31.7	-34.7	8.1	0.1	49.16	-	-	68.2	-19.04	Vert
4	2331.084	44.03	PK	32.4	-34.8	8.4	0.1	50.13	-	-	74	-23.87	Vert
4A	2331.084	32.16	VB1	32.4	-34.8	8.4	0.1	38.26	54	-15.74	-	-	Vert
5*	4466.767	41.17	PK	34.2	-34.9	10.4	0.3	51.17	-	-	68.2	-17.03	Vert
6*	7164.668	38.59	PK	35.9	-35.3	12.3	0.1	51.59	-	-	68.2	-16.61	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

Mid Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11n HT40 STBC 5510 MHz
Test By:K. Nguyen

Horizontal

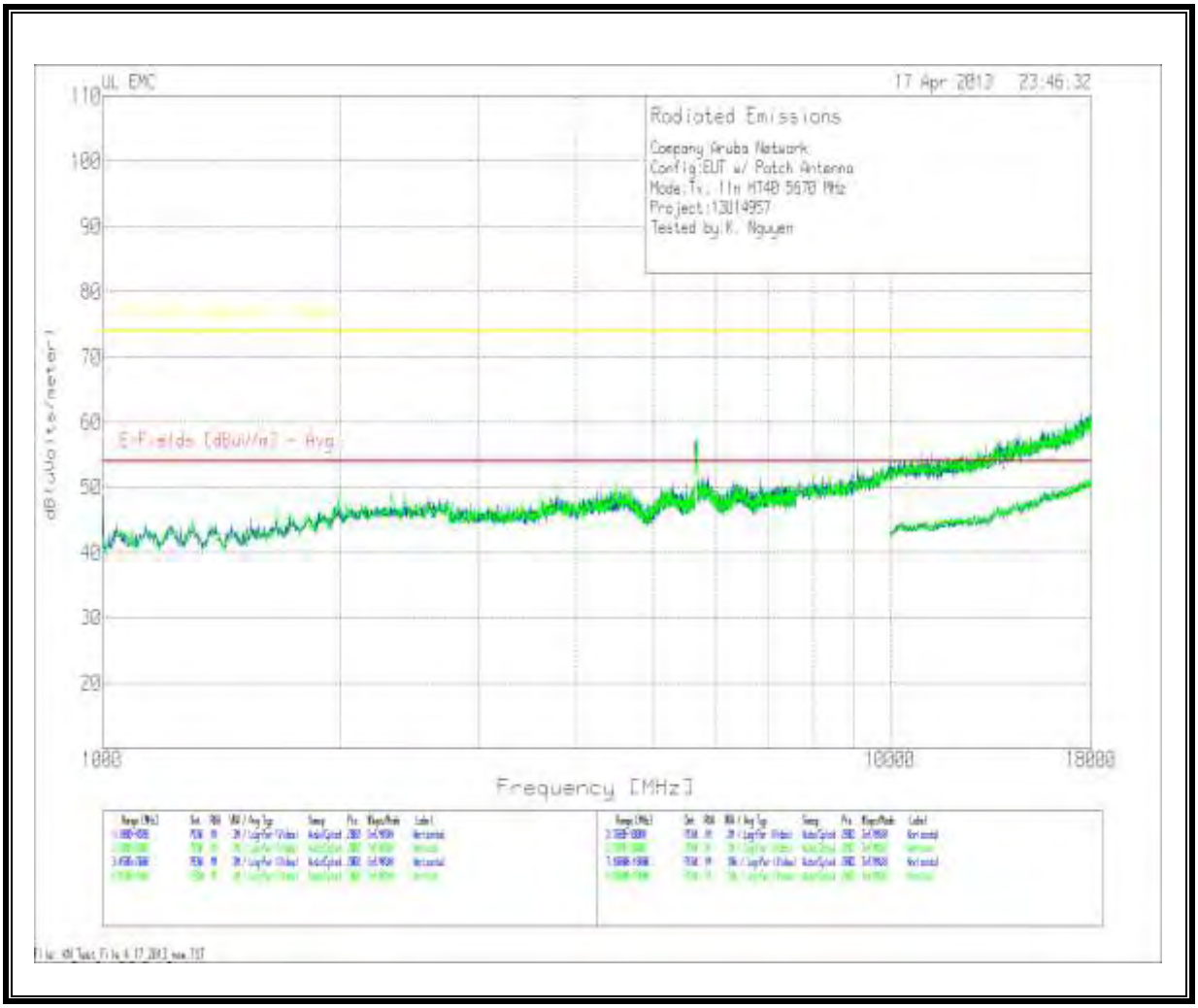
Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	1743.378	41.88	PK	30	-34.7	7.9	0.1	45.18	-	-	68.2	-23.02	Horz
2*	3035.982	39.57	PK	33.1	-35.2	9.2	0.1	46.77	-	-	68.2	-21.43	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
3	1118.941	48.38	PK	28.1	-35.6	7.1	0.1	48.08	-	-	74	-25.92	Vert
	1118.941	30.74	VB1	28.2	-35.5	7	0.1	30.54	54	-23.46	-	-	Vert
4**	1187.156	46.07	PK	28.4	-35.4	7.1	0.1	46.27	54	-7.73	74	-27.73	Vert
5*	1993.503	45.38	PK	31.7	-34.7	8.1	0.1	50.58	-	-	68.2	-17.62	Vert
6	2325.837	44.01	PK	32.4	-34.8	8.4	0.1	50.11	-	-	74	-23.89	Vert
	2325.837	30.7	VB1	32.4	-34.8	8.5	0.1	36.9	54	-17.1	-	-	Vert
7*	4466.767	40.63	PK	34.2	-34.9	10.4	0.3	50.63	-	-	68.2	-17.57	Vert

PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

High Channel



Project :13U14957
Company Name:Aruba Networks
Config:EUT w/ Patch Antenna
Mode:Tx; 11n HT40 5670 MHz
Test By:K. Nguyen

Horizontal

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
1*	2605.697	41.08	PK	32.6	-34.8	8.8	0.1	47.78	-	-	68.2	-20.42	Horz
11	9107.246	37.79	PK	36.8	-35.6	13.7	0.1	52.79	-	-	74	-21.21	Horz
11A	9107.246	26.02	VB1	36.8	-35.6	13.8	0.2	41.22	54	-12.78	-	-	Horz

Vertical

Marker No.	Test Frequency [MHz]	Meter Reading [dBuV]	Detector	T345 Ant Factor [dB/m]	T145 Preamp Gain [dB]	Cable Factor [dB]	T159 BRF [dB]	Corrected Reading [dBuV]	E-Fields [dBuV/m] - Avg Limit	Avg Margin [dB]	E-Fields [dBuV/m] - Peak Limit	Peak Margin [dB]	Polarity
2**	1664.668	44.27	PK	29.4	-34.8	7.7	0.1	46.67	54	-7.33	74	-27.33	Vert
3*	1997.001	44.08	PK	31.7	-34.7	8.1	0.1	49.28	-	-	68.2	-18.92	Vert
5*	2413.293	43.19	PK	32.4	-34.7	8.5	0.1	49.49	-	-	68.2	-18.71	Vert
6	3781.109	42.28	PK	33.8	-35	9.7	0.1	50.88	-	-	74	-23.12	Vert
6A	3781.109	32.83	VB1	33.8	-34.9	9.7	0.1	41.53	54	-12.47	-	-	Vert
7*	4489.505	41.4	PK	34.2	-35	10.3	0.3	51.2	-	-	68.2	-17	Vert
8*	6831.584	39.06	PK	35.8	-35.1	12.1	0.1	51.96	-	-	68.2	-16.24	Vert
9	7301	38.76	PK	35.9	-35.4	12.4	0.1	51.76	-	-	74	-22.24	Vert
9A	7301	26.18	VB1	35.9	-35.4	12.4	0.1	39.18	54	-14.82	-	-	Vert
10	9086.457	38.45	PK	36.8	-35.6	13.7	0.3	53.65	-	-	74	-20.35	Vert
10A	9096.457	26.14	VB1	36.8	-35.6	13.8	0.3	41.44	54	-12.56	-	-	Vert

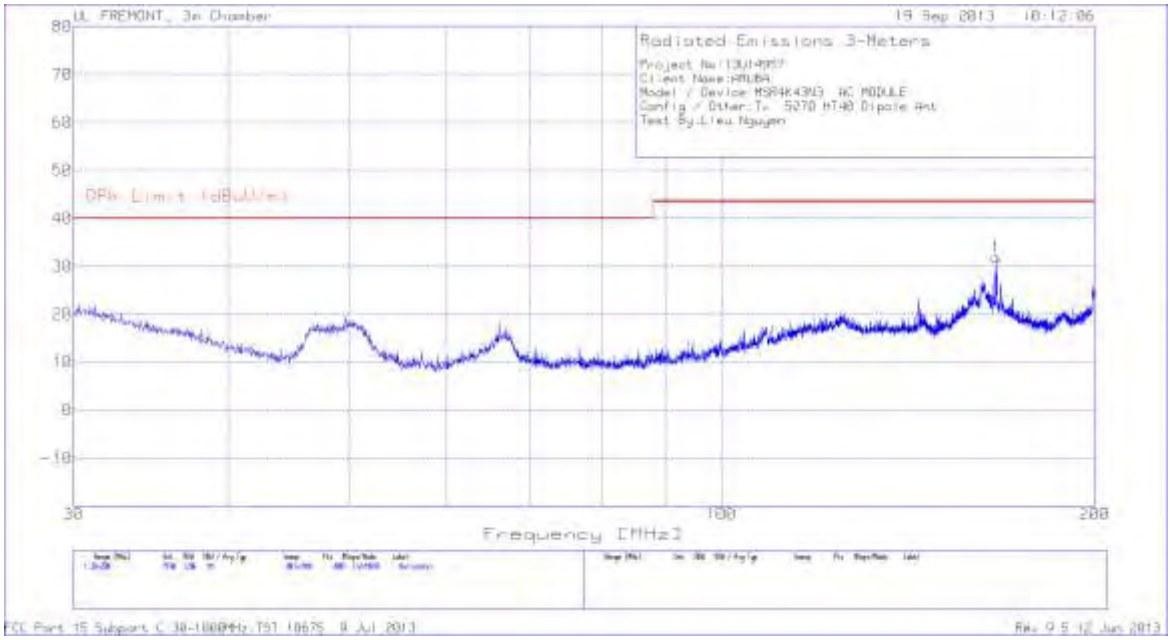
PK - Peak detector
VB1 - KDB 789033 Method: VB Alternative Reduced Video
* Denotes an emission that falls outside of the restricted bands and is subject to a peak emission limit of 68.2 dBuV (-27dBm).
** Denotes a peak measurement that satisfies both peak and average emission limits.

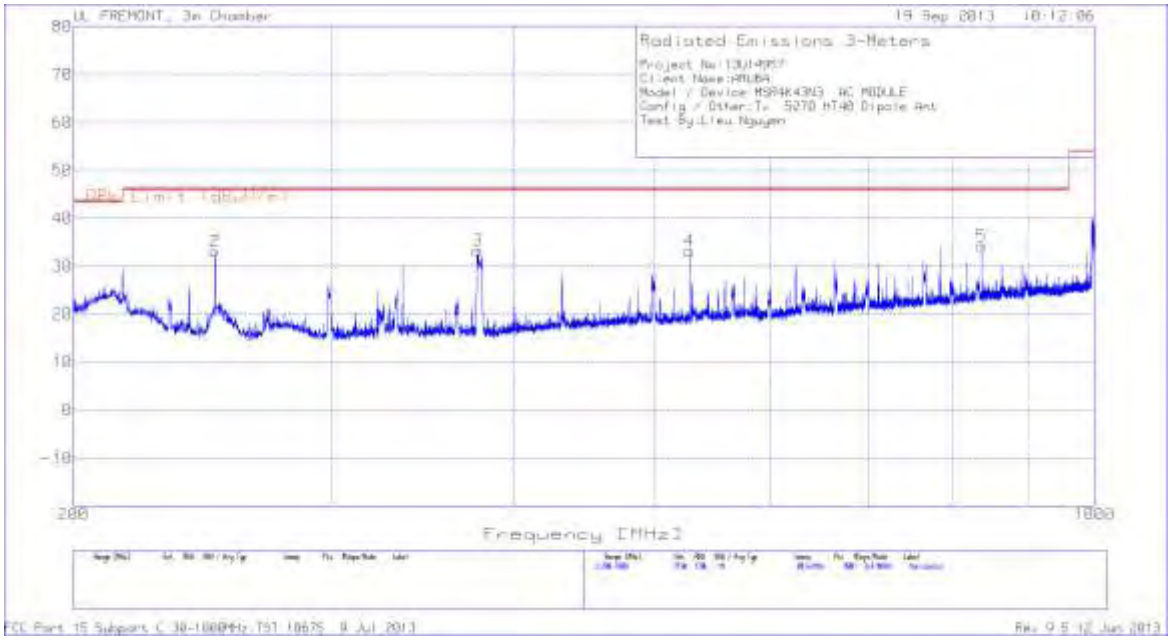
10.4. WORST-CASE BELOW 1 GHz (DIPOLE ANTENNA)

10.4.1. AC UNIT

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

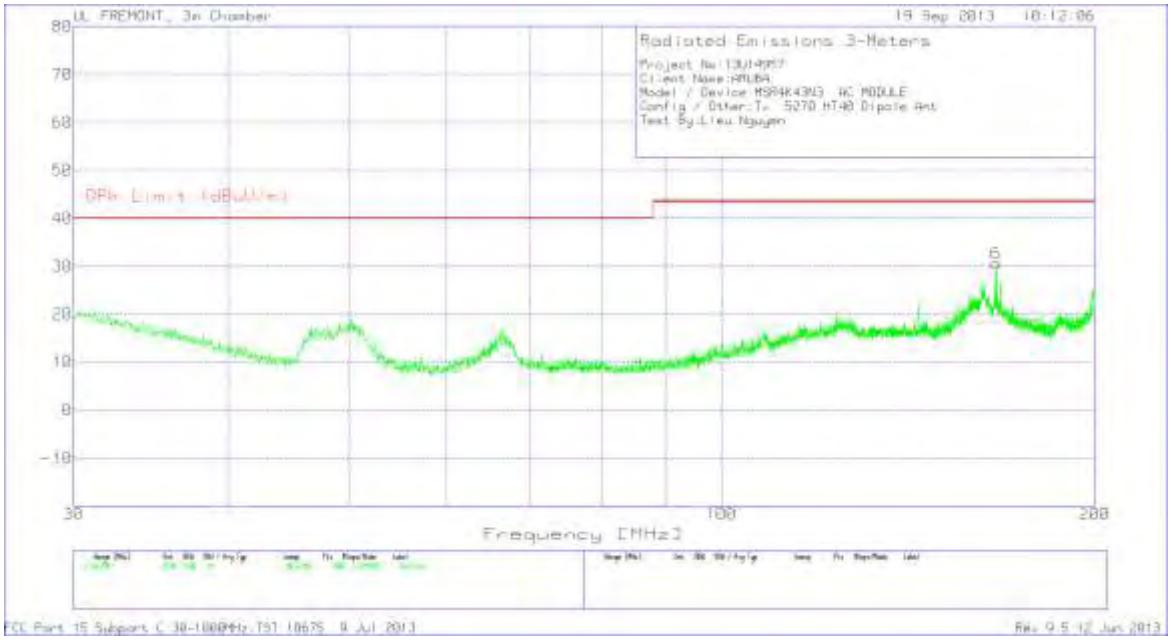
HORIZONTAL PLOT

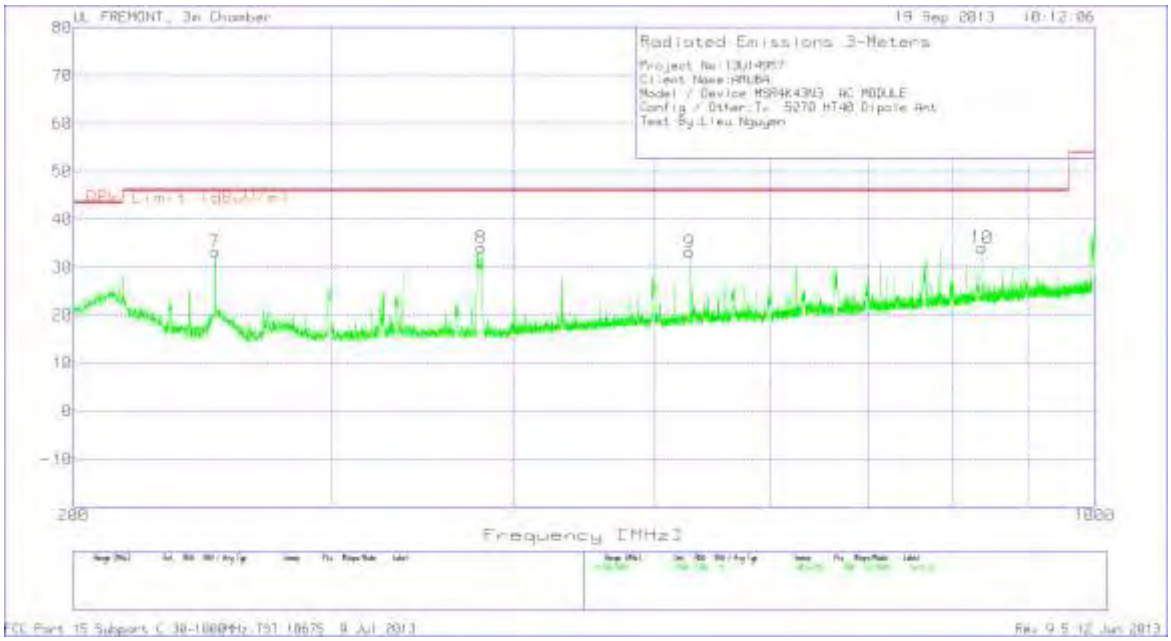




SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT





HORIZONTAL & VERTICAL DATA (DIPOLE ANTENNA)

Trace Markers

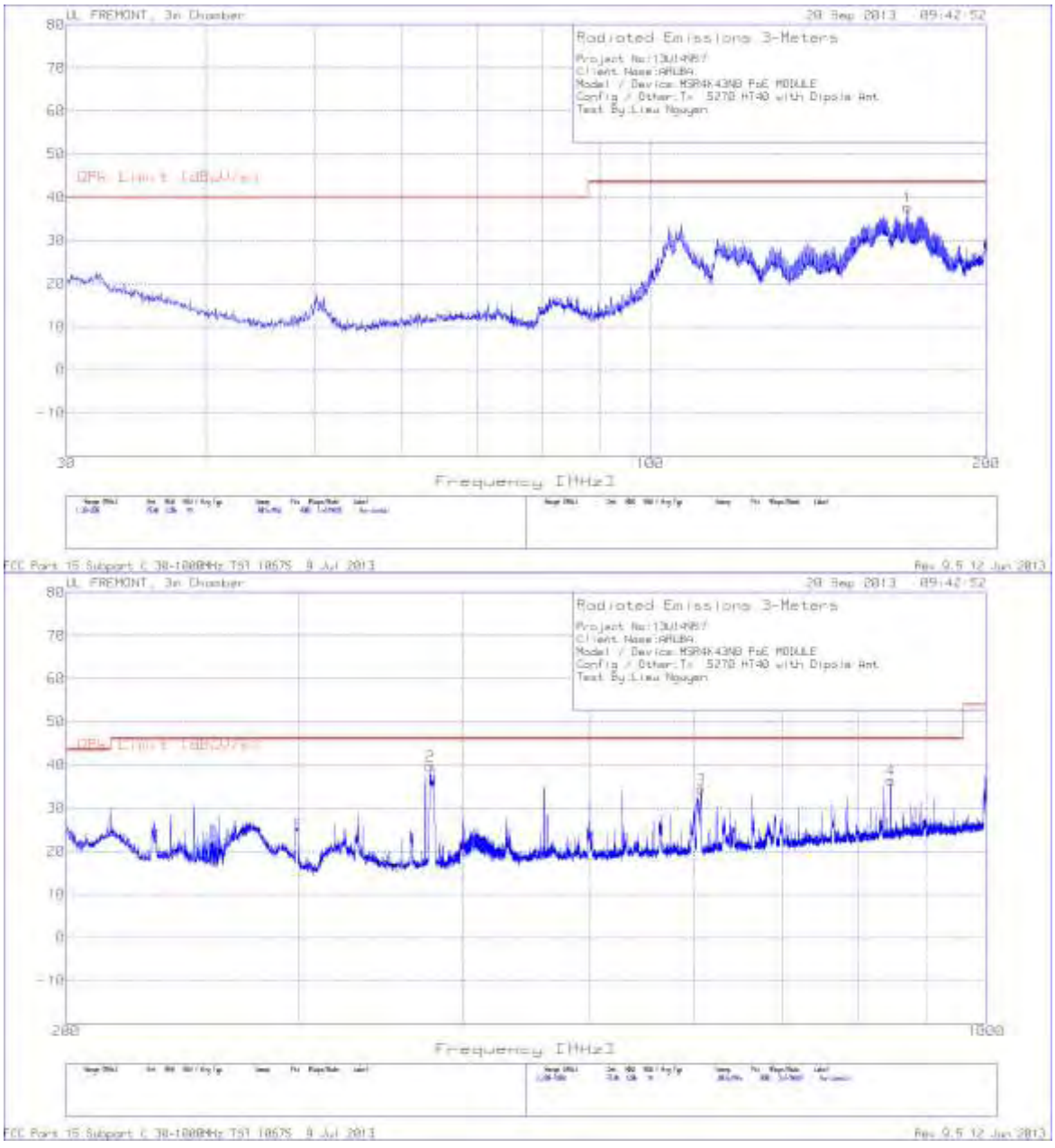
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)
1	166.595	46.35	PK	11.7	-26.2	31.85	43.52	-11.67
6	166.51	45.09	PK	11.7	-26.2	30.59	43.52	-12.93
2	250	47.01	PK	11.5	-25.4	33.11	46.02	-12.91
3	377.9	43.85	PK	15	-25.5	33.35	46.02	-12.67
4	528	41.05	PK	17.9	-25.8	33.15	46.02	-12.87
5	837	36.71	PK	21.7	-24.2	34.21	46.02	-11.81
7	250	47.16	PK	11.5	-25.4	33.26	46.02	-12.76
8	380.1	44.58	PK	15	-25.5	34.08	46.02	-11.94
9	528	41.06	PK	17.9	-25.8	33.16	46.02	-12.86
10	837	36.55	PK	21.7	-24.2	34.05	46.02	-11.97

PK - Peak detector

10.4.2. PoE UNIT

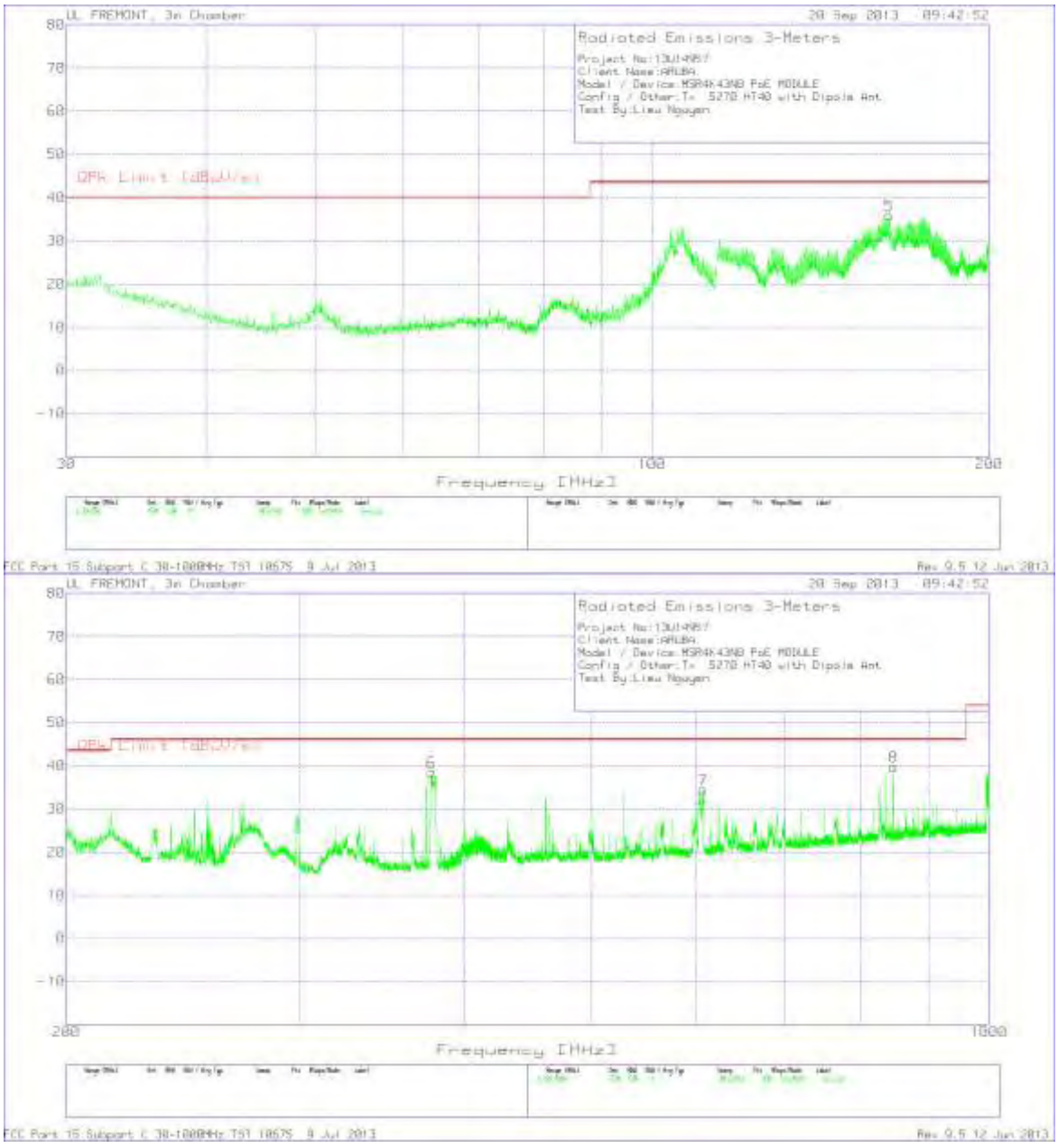
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)
1	169.9525	52.51	PK	11.5	-26.2	37.81	43.52	-5.71
5	162.8975	50.07	PK	12	-26.2	35.87	43.52	-7.65
2	377.9	50.34	PK	15	-25.5	39.84	46.02	-6.18
3	607.2	41.34	PK	18.6	-25.5	34.44	46.02	-11.58
4	845.9	38.95	PK	21.6	-24	36.55	46.02	-9.47
6	378	49.13	PK	15	-25.5	38.63	46.02	-7.39
7	607.1	41.43	PK	18.6	-25.5	34.53	46.02	-11.49
8	846.3	42.24	PK	21.6	-24	39.84	46.02	-6.18

PK - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
169.9919	43.5	Av	11.5	-26.2	28.8	43.52	-14.72	206

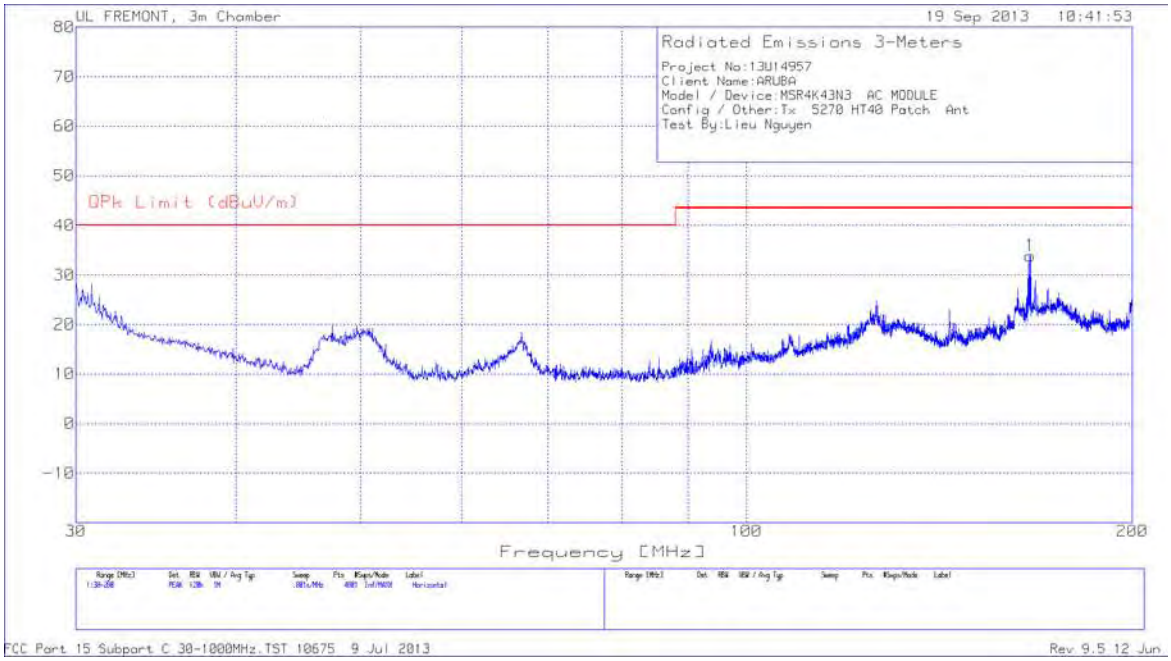
LgAv - average log detection
Av - average detection

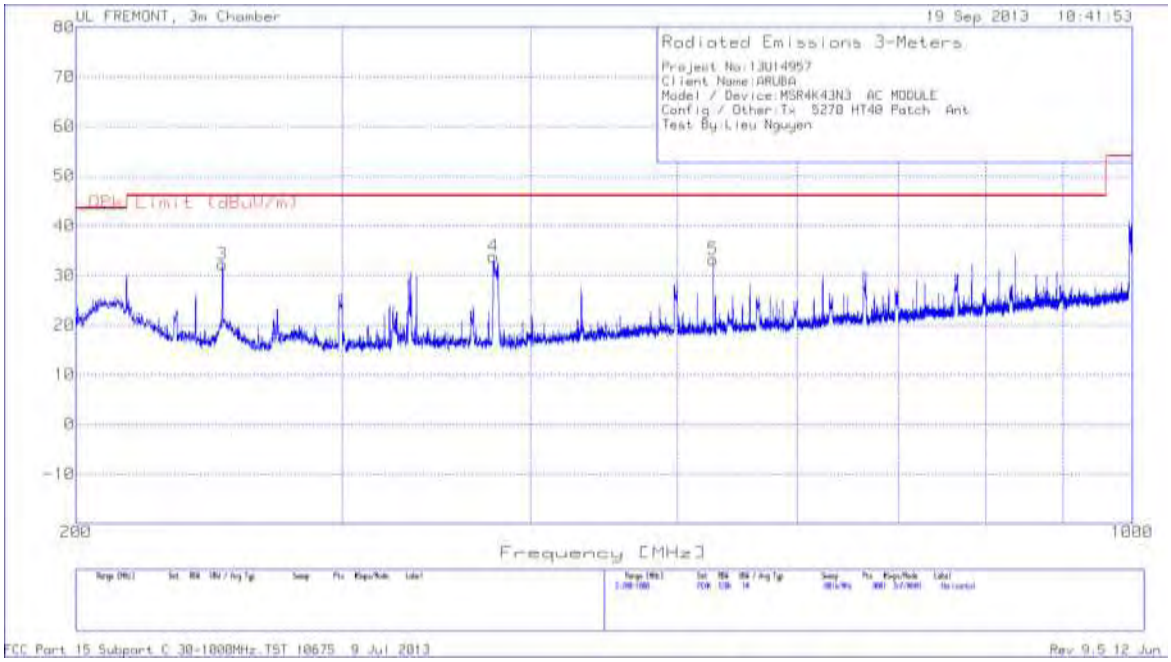
10.5. WORST-CASE BELOW 1 GHz (PATCH ANTENNA)

10.5.1. AC UNIT

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

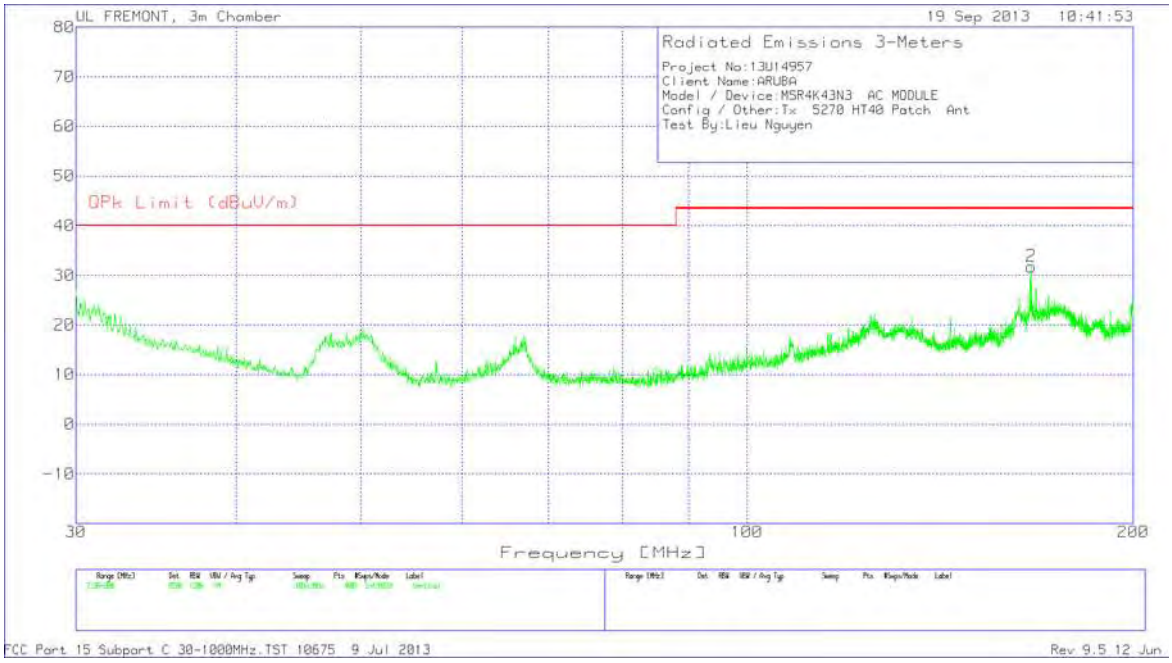
HORIZONTAL PLOT





SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



HORIZONTAL & VERTICAL DATA

Trace Markers

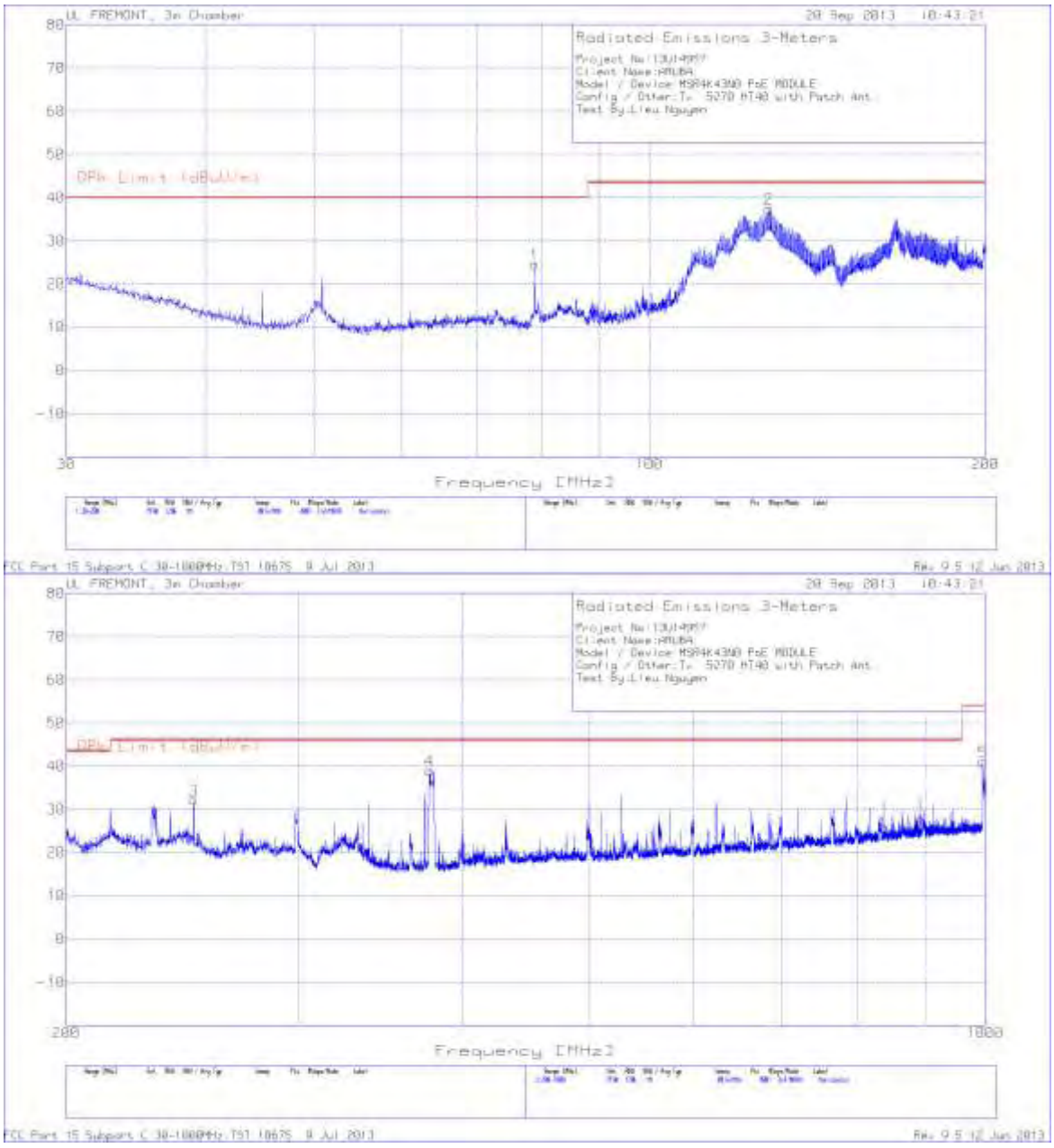
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)
1	166.51	48.34	PK	11.7	-26.2	33.84	43.52	-9.68
2	166.5525	46.26	PK	11.7	-26.2	31.76	43.52	-11.76
3	250	46.15	PK	11.5	-25.4	32.25	46.02	-13.77
4	377.9	44.29	PK	15	-25.5	33.79	46.02	-12.23
5	528	41.12	PK	17.9	-25.8	33.22	46.02	-12.8
6	250	45.61	PK	11.5	-25.4	31.71	46.02	-14.31
7	378.2	43.72	PK	15	-25.5	33.22	46.02	-12.8
8	528	41.17	PK	17.9	-25.8	33.27	46.02	-12.75

PK - Peak detector

10.5.2. PoE MODULE PATCH ANTENNA

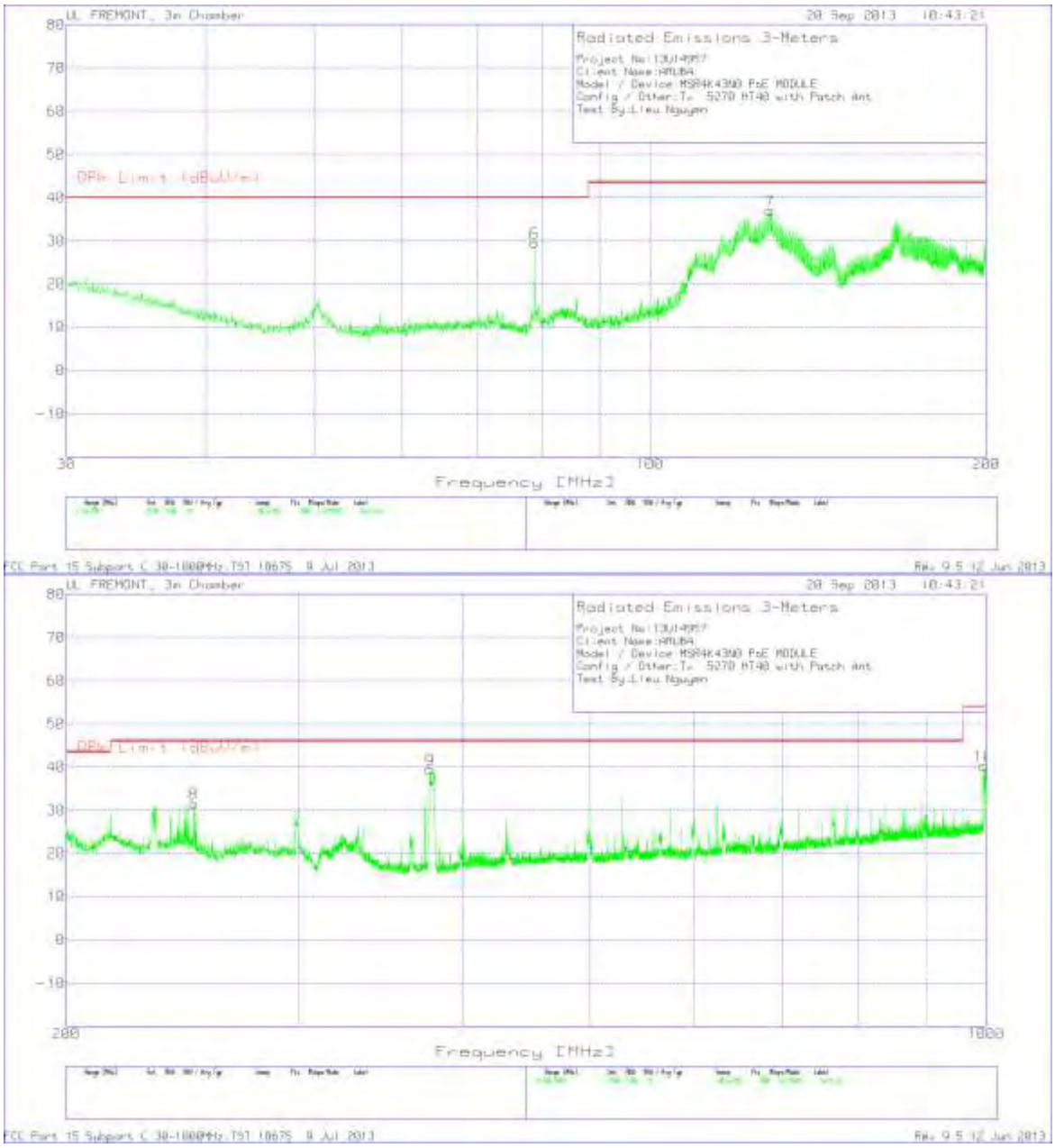
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)
1	78.9175	43.75	PK	7.8	-27	24.55	40	-15.45
2	128.005	49.86	PK	14.2	-26.6	37.46	43.52	-6.06
6	78.79	48.71	PK	7.8	-27	29.51	40	-10.49
7	128.005	49.32	PK	14.2	-26.6	36.92	43.52	-6.6
3	250	46.06	PK	11.5	-25.4	32.16	46.02	-13.86
4	377.9	49.52	PK	15	-25.5	39.02	46.02	-7
5	995.4	41.14	PK	23.1	-23.2	41.04	53.97	-12.93
8	250	45.48	PK	11.5	-25.4	31.58	46.02	-14.44
9	377.9	49.88	PK	15	-25.5	39.38	46.02	-6.64
10	995.5	40.4	PK	23.1	-23.2	40.3	53.97	-13.67

PK - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

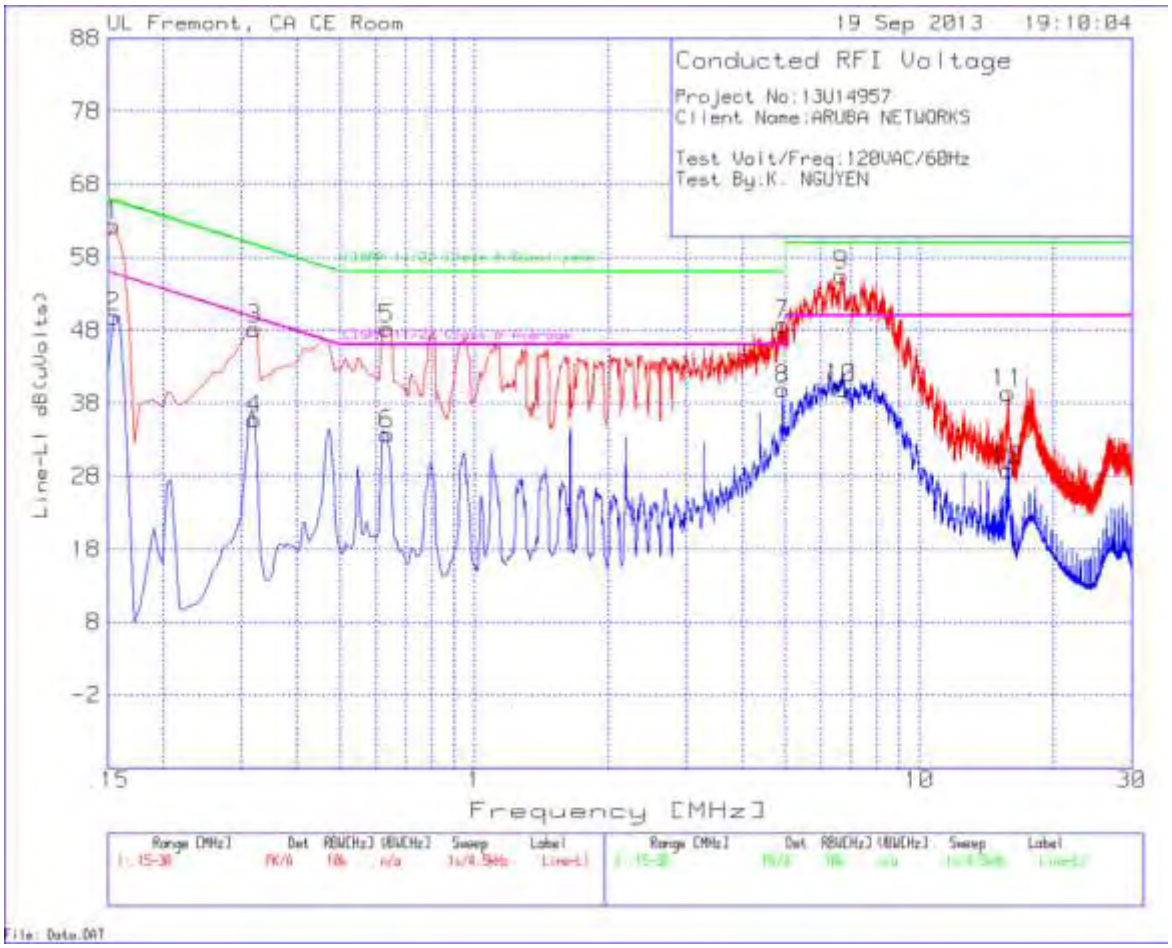
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

11.1. AC MODEL RESULTS

LINE 1 RESULTS

Line 1

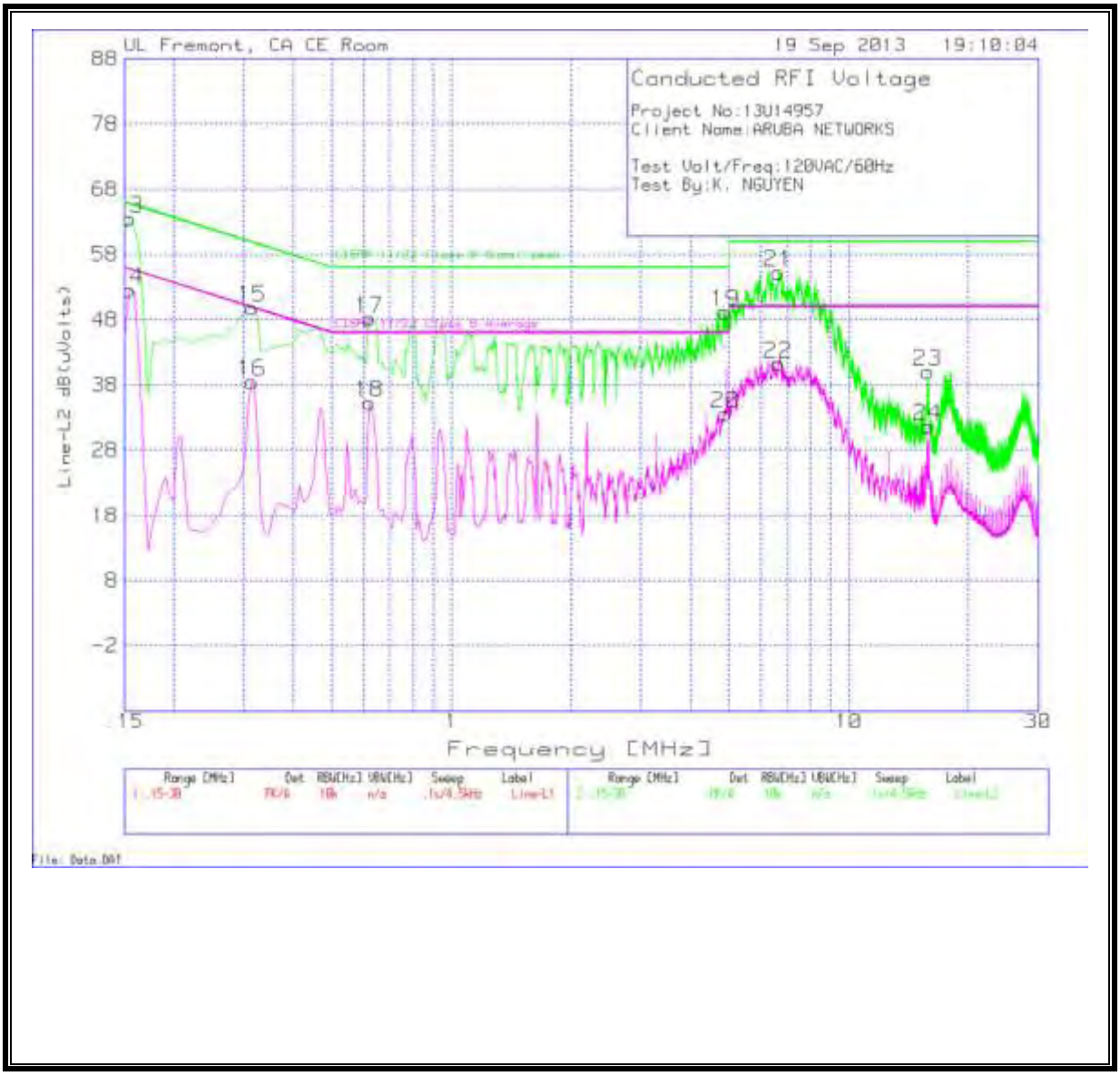


Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	0.1545	62.23	PK	0.1	0	62.33	65.8	-3.47	-	-
2	0.1545	49.69	Av	0.1	0	49.79	-	-	55.8	-6.01
3	0.321	48.03	PK	0.1	0	48.13	59.7	-11.57	-	-
4	0.321	35.66	Av	0.1	0	35.76	-	-	49.7	-13.94
5	0.636	48.12	PK	0.1	0	48.22	56	-7.78	-	-
6	0.636	33.68	Av	0.1	0	33.78	-	-	46	-12.22
7	4.929	48.62	PK	0.1	0.1	48.82	56	-7.18	-	-
8	4.929	39.76	Av	0.1	0.1	39.96	-	-	46	-6.04
9	6.666	55.36	PK	0.1	0.1	55.56	60	-4.44	-	-
10	6.666	39.81	Av	0.1	0.1	40.01	-	-	50	-9.99
11	15.81	38.95	PK	0.2	0.2	39.35	60	-20.65	-	-
12	15.81	28.48	Av	0.2	0.2	28.88	-	-	50	-21.12

LINE 2 RESULTS



Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
13	0.1545	63.37	PK	0.1	0	63.47	65.8	-2.33	-	-
14	0.1545	52.45	Av	0.1	0	52.55	-	-	55.8	-3.25
15	0.31425	49.75	PK	0.1	0	49.85	59.9	-10.05	-	-
16	0.31425	38.35	Av	0.1	0	38.45	-	-	49.9	-11.45
17	0.6225	48.08	PK	0.1	0	48.18	56	-7.82	-	-
18	0.6225	35.17	Av	0.1	0	35.27	-	-	46	-10.73
19	4.8885	48.96	PK	0.1	0.1	49.16	56	-6.84	-	-
20	4.8885	33.45	Av	0.1	0.1	33.65	-	-	46	-12.35
21	6.6525	55.1	PK	0.1	0.1	55.3	60	-4.7	-	-
22	6.6525	41.04	Av	0.1	0.1	41.24	-	-	50	-8.76
23	15.801	39.59	PK	0.2	0.2	39.99	60	-20.01	-	-
24	15.801	31.3	Av	0.2	0.2	31.7	-	-	50	-18.3

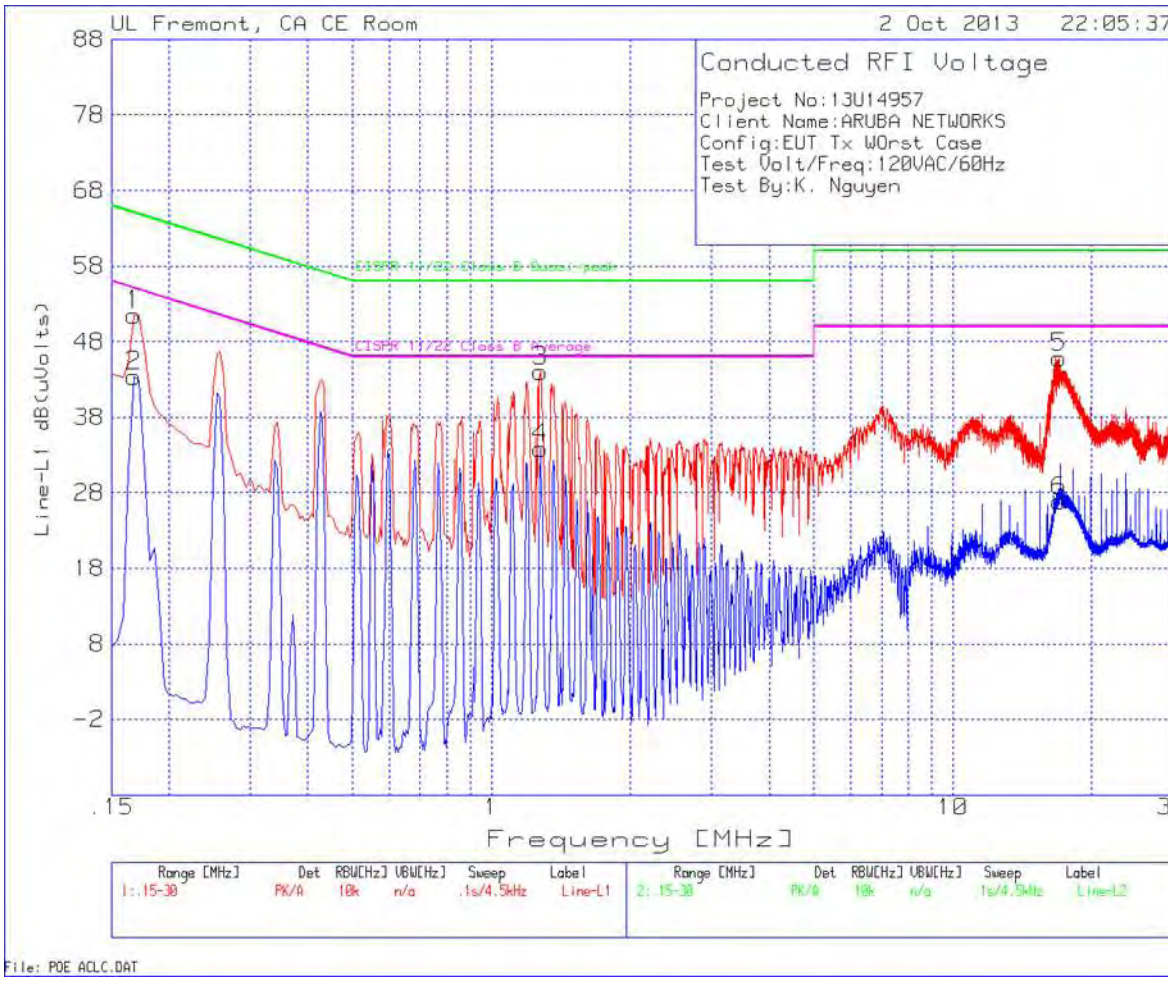
PK - Peak detector

Av - average detection

11.2. POE MODEL RESULTS

LINE 1 RESULTS

Line 1



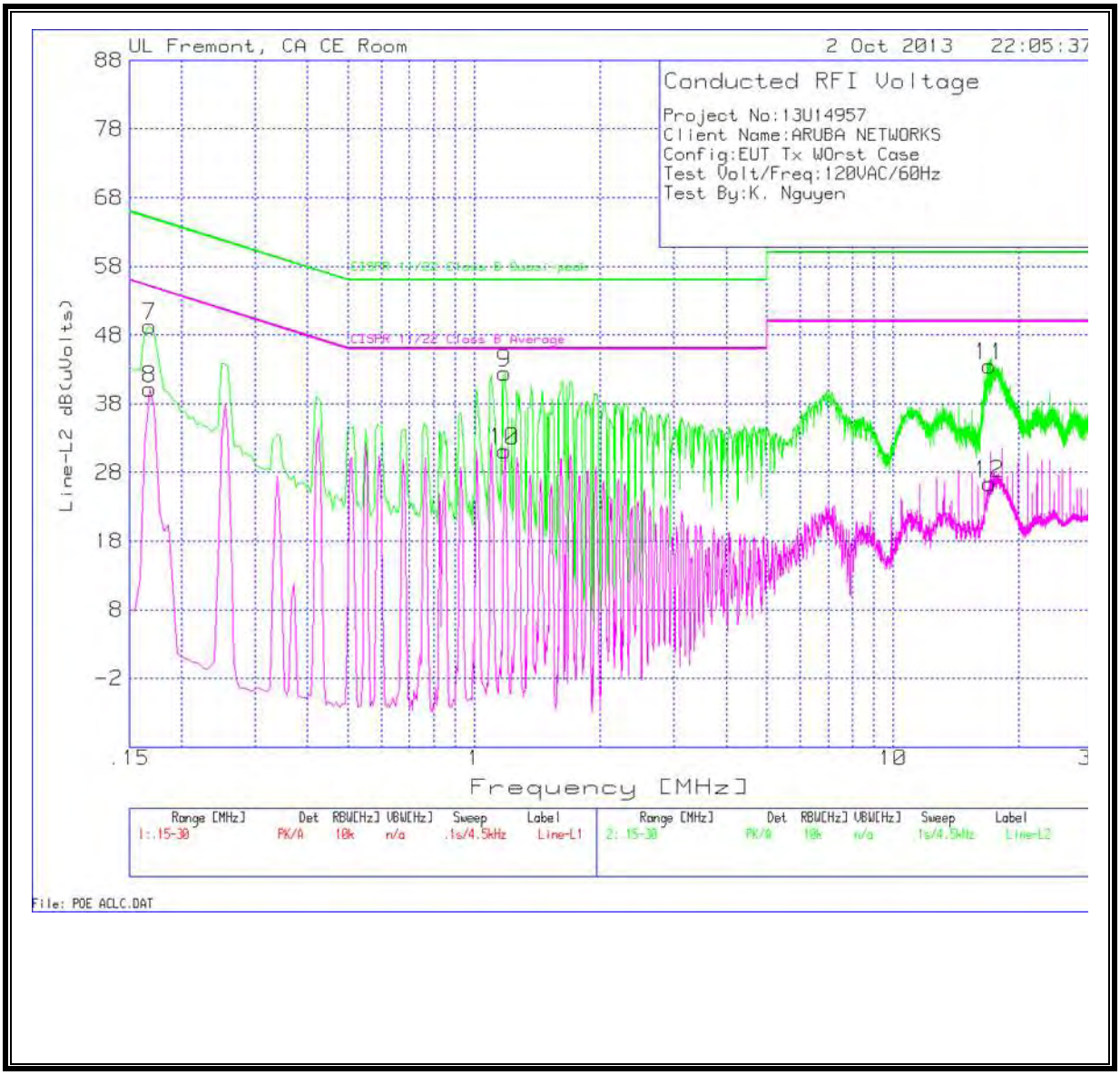
Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
1	0.168	51.44	PK	0.1	0	51.54	65.1	-13.56	-	-
2	0.168	43.3	Av	0.1	0	43.4	-	-	55.1	-11.7
3	1.275	43.8	PK	0.1	0.1	44	56	-12	-	-
4	1.275	33.66	Av	0.1	0.1	33.86	-	-	46	-12.14
5	17.0115	45.41	PK	0.2	0.2	45.81	60	-14.19	-	-
6	17.0115	26.43	Av	0.2	0.2	26.83	-	-	50	-23.17

PK - Peak detector
Av - average detection

LINE 2 RESULTS



Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CISPR 11/22 Class B Quasi-peak	Margin to Limit (dB)	CISPR 11/22 Class B Average	Margin to Limit (dB)
7	0.168	49.19	PK	0.1	0	49.29	65.1	-15.81	-	-
8	0.168	40.07	Av	0.1	0	40.17	-	-	55.1	-14.93
9	1.1805	42.43	PK	0.1	0	42.53	56	-13.47	-	-
10	1.1805	31	Av	0.1	0	31.1	-	-	46	-14.9
11	17.0115	43.11	PK	0.2	0.2	43.51	60	-16.49	-	-
12	17.0115	25.98	Av	0.2	0.2	26.38	-	-	50	-23.62

PK - Peak detector

Av - average detection

12. DYNAMIC FREQUENCY SELECTION

12.1. OVERVIEW

12.1.1. LIMITS

INDUSTRY CANADA

IC RSS-210 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-210 Issue 7 A9.4 (b) (ii) **Channel Availability Check Time:** …

Additional requirements for the band 5600-5650 MHz: Until further notice, devices subject to this Section shall not be capable of transmitting in the band 5600-5650 MHz, so that Environment Canada weather radars operating in this band are protected.

RSS-210 Issue 7 A9.4 (b) (iv) **Channel closing time:** the maximum channel closing time is 260 ms.

FCC

§15.407 (h) and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

Table 1: Applicability of DFS requirements prior to use of a channel

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client **(without DFS)**	Client **(with DFS)**
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.		

Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows: For the Short pulse radar Test Signals this instant is the end of the *Burst*. For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated. For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission. The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.	

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (Microseconds)	PRI (Microseconds)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Table 6 – Long Pulse Radar Test Signal

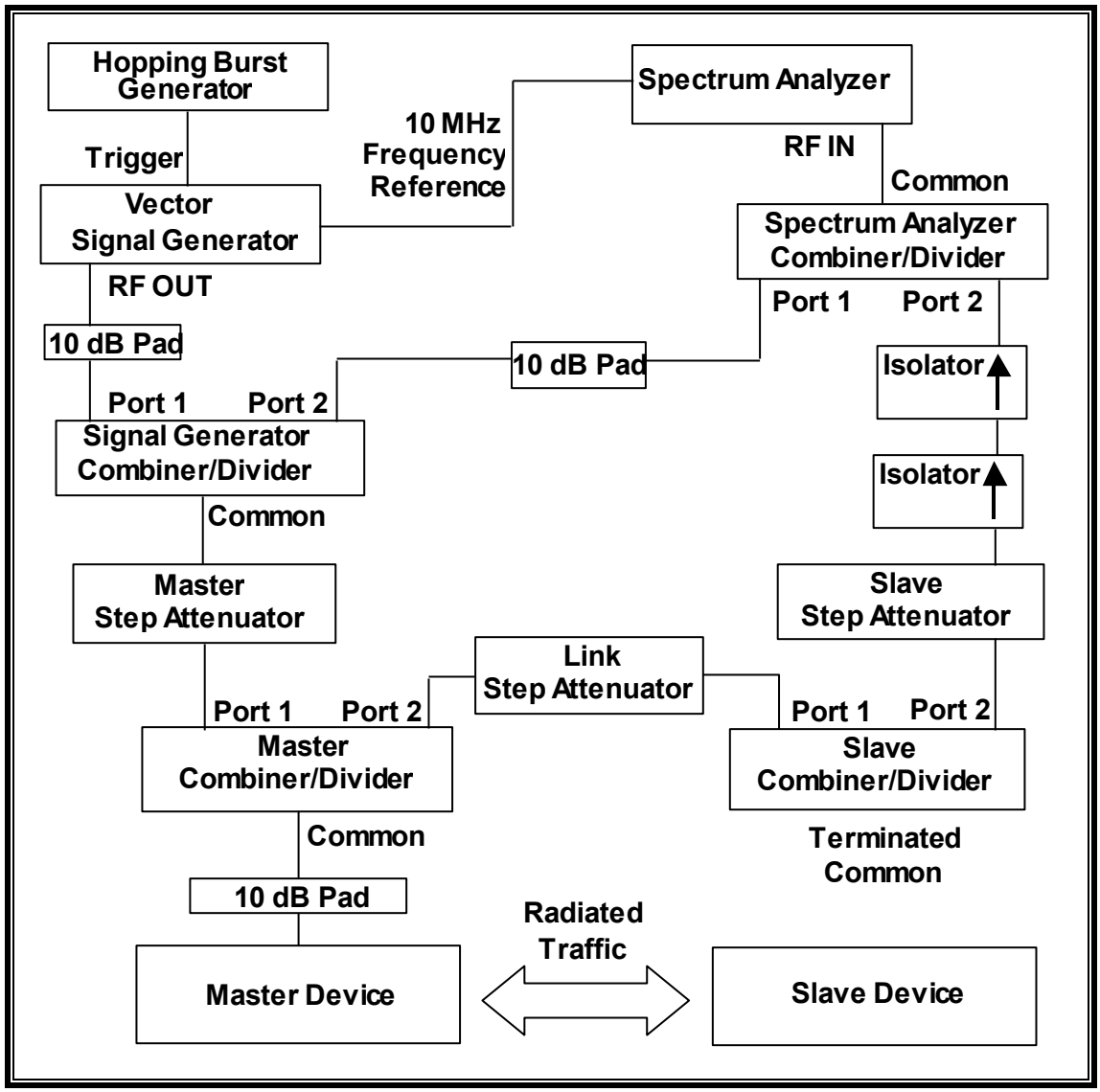
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform	Pulse Width (µsec)	PRI (µsec)	Burst Length (ms)	Pulses per Hop	Hopping Rate (kHz)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	300	9	.333	70%	30

12.1.2. TEST AND MEASUREMENT SYSTEM

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

Should multiple RF ports be utilized for the Master and/or Slave devices (for example, for diversity or MIMO implementations), additional combiner/dividers are inserted between the Master Combiner/Divider and the pad connected to the Master Device (and/or between the Slave Combiner/Divider and the pad connected to the Slave Device). Additional pads are utilized such that there is one pad at each RF port on each EUT.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected in place of the master device. The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the Link Step Attenuator between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The WLAN traffic level, as displayed on the spectrum analyzer, is confirmed to be at lower amplitude than the radar detection threshold and is confirmed to be the Radar Detection Device rather than the associated device. If a different setting of the Master Step Attenuator is required to meet the above conditions, a new System Calibration is performed for the new Master Step Attenuator setting.

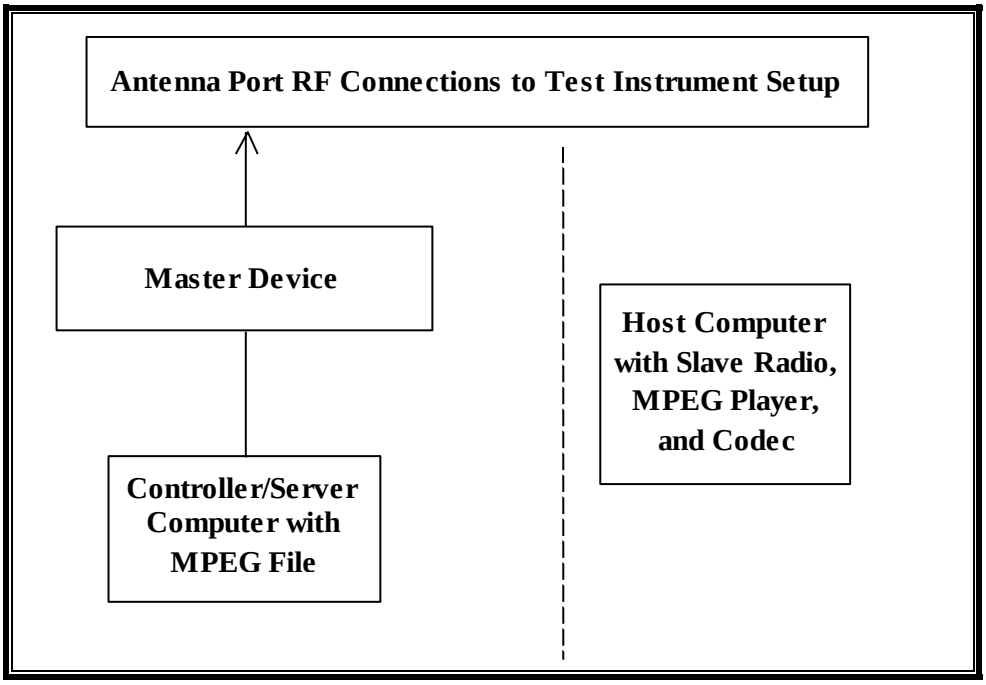
TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the DFS tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset Number**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	09/10/14
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	09/12/14
Arbitrary Waveform Generator	Agilent / HP	33220A	C01146	09/10/14

12.1.3. SETUP OF EUT

CONDUCTED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Notebook PC (Controller/Server)	Lenovo	Type 7663-04U	L3-KE324 08/09	DoC
AC Adapter (Controller/Server PC)	Lenovo	ADLX65NLT2A	11S45N0319Z1ZL ZF34G9P5	DoC
Notebook PC (Host/Slaver Radio)	Lenovo	Type 4173-B74	R9-LC5GV 12/01	QDS-BRCM1046
AC Adapter (Host PC)	Lenovo	92P1156	11S92P1156Z1ZD XN14L577	Doc

12.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges excluding operation in the 5600 to 5650 MHz band.

.
The EUT is a Master Device.

The highest power level within these bands is 26.987 dBm EIRP in the 5250-5350 MHz band and 27.895 dBm EIRP in the 5470-5725 MHz band.

The highest gain antenna assembly utilized with the EUT has a gain of 14 dBi in the 5250-5350 MHz band and 14 dBi in the 5470-5725 MHz band. The lowest gain antenna assembly utilized with the EUT has a gain of 9 dBi in the 5250-5350 MHz band and 9 dBi in the 5470-5725 MHz band, however testing was performed with a declared lowest gain of 3 dBi.

Two identical antennas are utilized to meet the diversity and MIMO operational requirements.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is –64 + 3 + 1 = -60 dBm.

The calibrated conducted DFS Detection Threshold level is set to –61 dBm. The tested level is lower than the required level hence it provides margin to the limit.

The EUT uses two transmitter/receiver chains each connected to a 50-ohm coaxial antenna port. All antenna ports are connected to the test system via a power divider to perform conducted tests.

The Slave device associated with the EUT during these tests does not have radar detection capability.

WLAN traffic is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using the media player with the V2.61 Codec package.

TPC is required since the maximum EIRP is greater than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. Two nominal channel bandwidths are implemented: 20 MHz and 40 MHz.

The software installed in the access point is revision 4.7.0.0.

UNIFORM CHANNEL SPREADING

See Manufacturer’s Attestation.

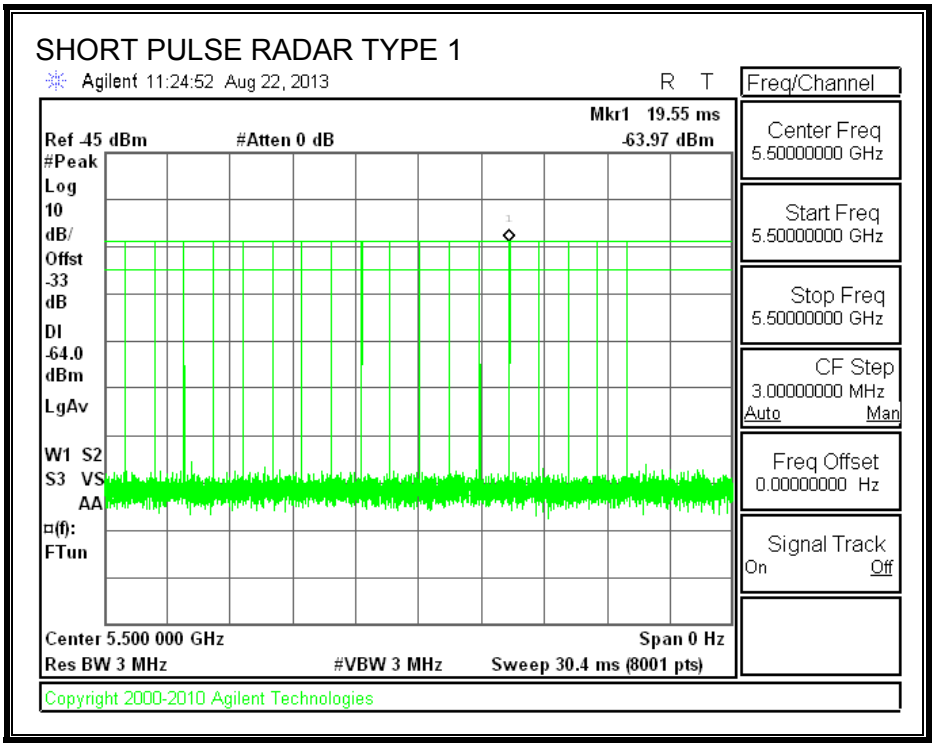
12.2. RESULTS FOR 20 MHz BANDWIDTH

12.2.1. TEST CHANNEL

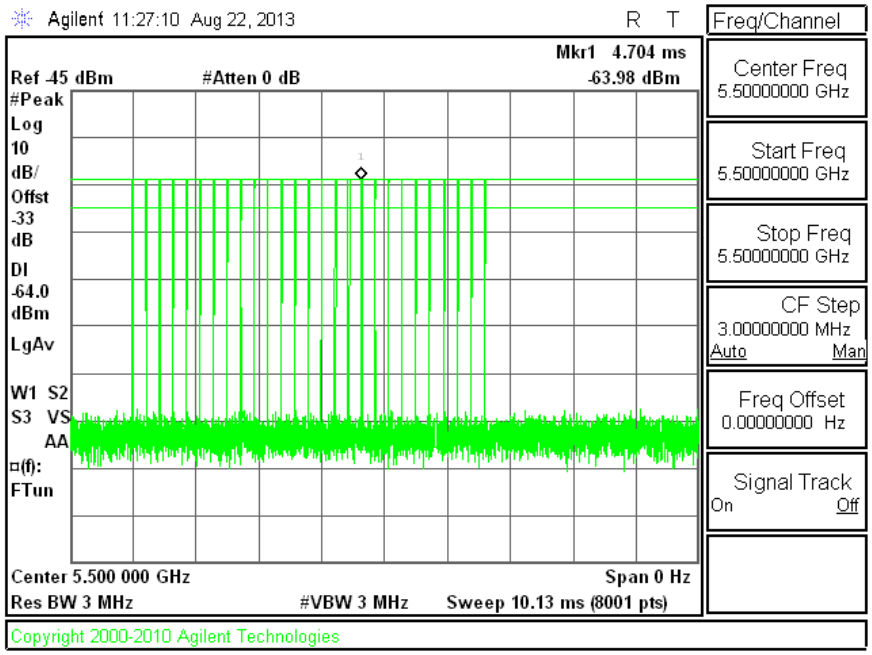
All tests were performed at a channel center frequency of 5500 MHz.

12.2.2. RADAR WAVEFORMS AND TRAFFIC

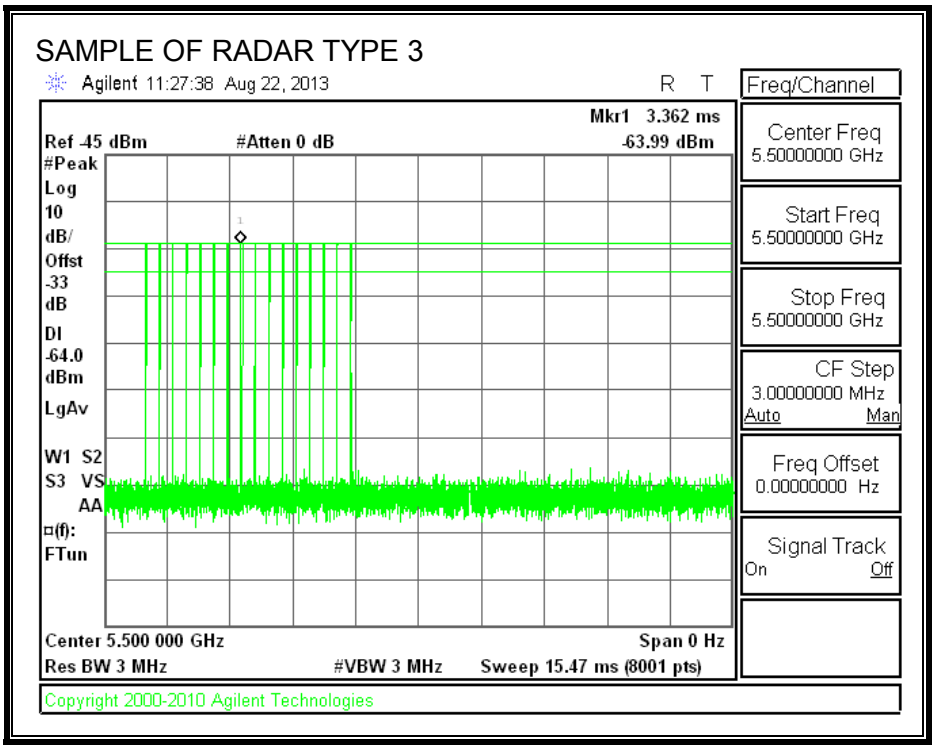
RADAR WAVEFORMS



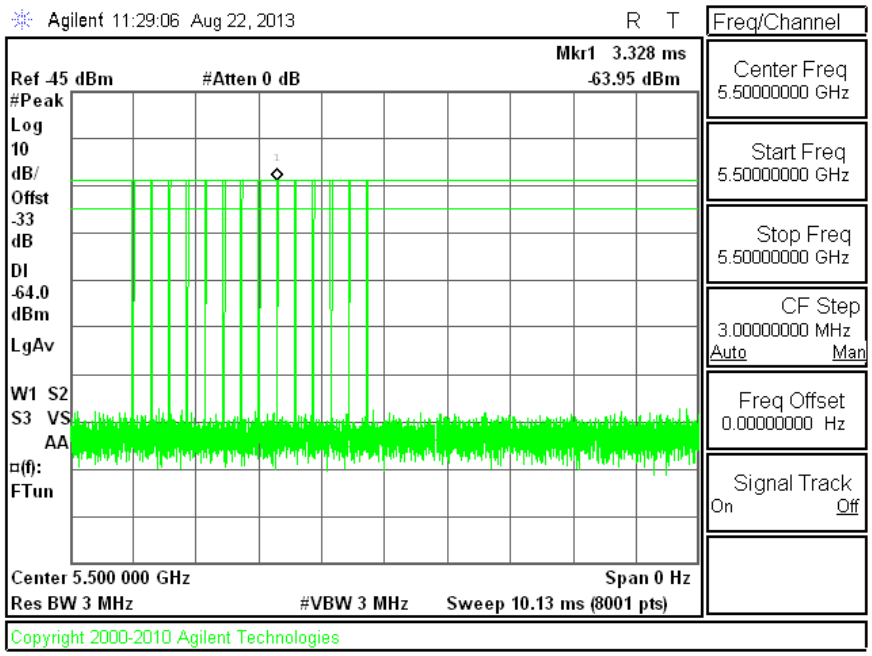
SAMPLE OF RADAR TYPE 2



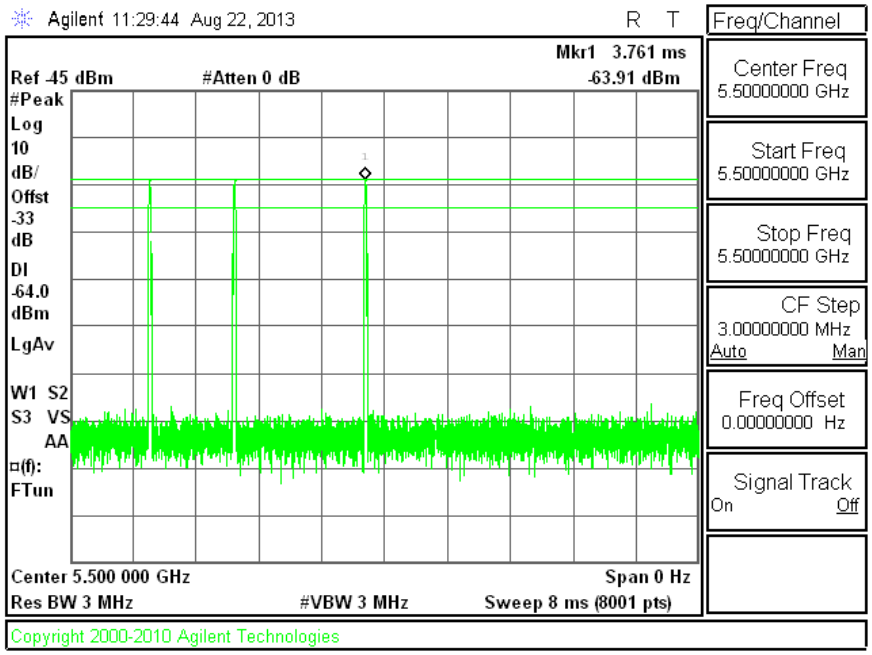
SAMPLE OF RADAR TYPE 3

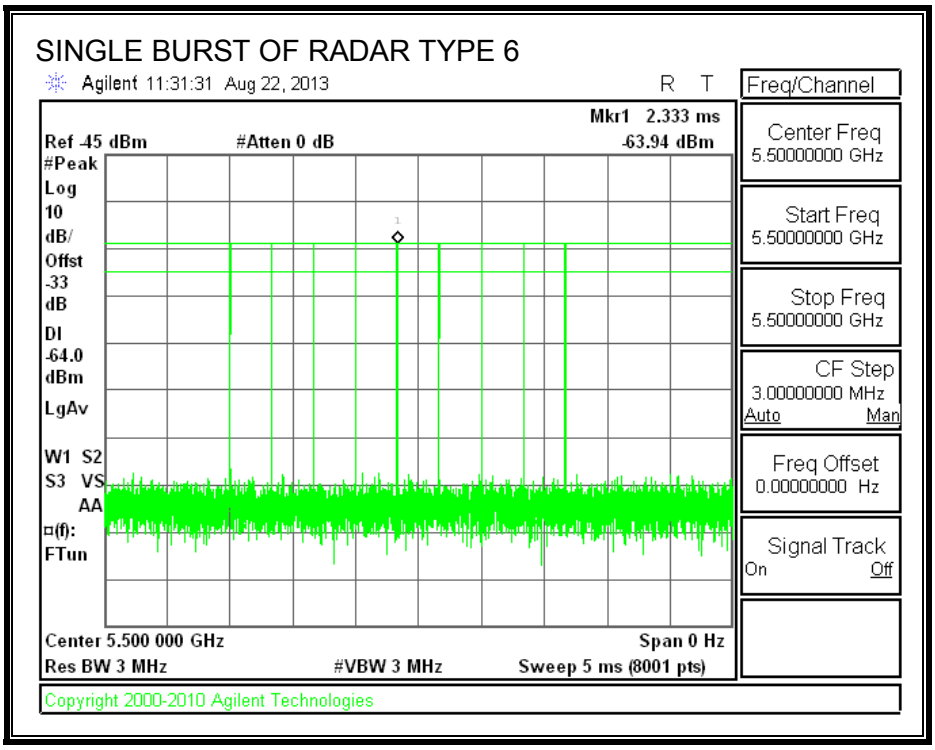


SAMPLE OF RADAR TYPE 4

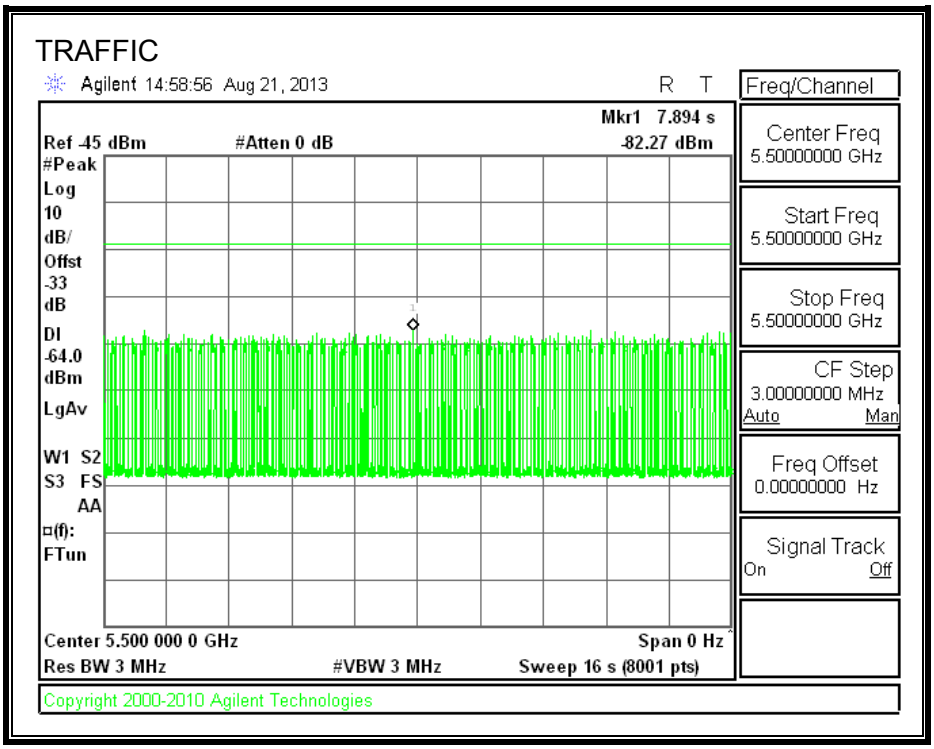


SAMPLE OF SINGLE BURST OF RADAR TYPE 5





TRAFFIC



12.2.3. CHANNEL AVAILABILITY CHECK TIME

PROCEDURE TO DETERMINE INITIAL POWER-UP CYCLE TIME

A link was established on channel then the EUT was rebooted. The time from the cessation of traffic to the re-initialization of traffic was measured as the time required for the EUT to complete the total power-up cycle. The time to complete the initial power-up period is 60 seconds less than this total power-up time.

PROCEDURE FOR TIMING OF RADAR BURST

With a link established on channel, the EUT was rebooted. A radar signal was triggered within 0 to 6 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

The Non-Occupancy list was cleared. With a link established on channel, the EUT was rebooted. A radar signal was triggered within 54 to 60 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

QUANTITATIVE RESULTS

No Radar Triggered

Timing of Reboot (sec)	Timing of Start of Traffic (sec)	Total Power-up Cycle Time (sec)	Initial Power-up Cycle Time (sec)
30.34	164.1	133.8	73.8

Radar Near Beginning of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.38	104.6	74.2	0.5

Radar Near End of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.49	162.8	132.3	58.6

QUALITATIVE RESULTS

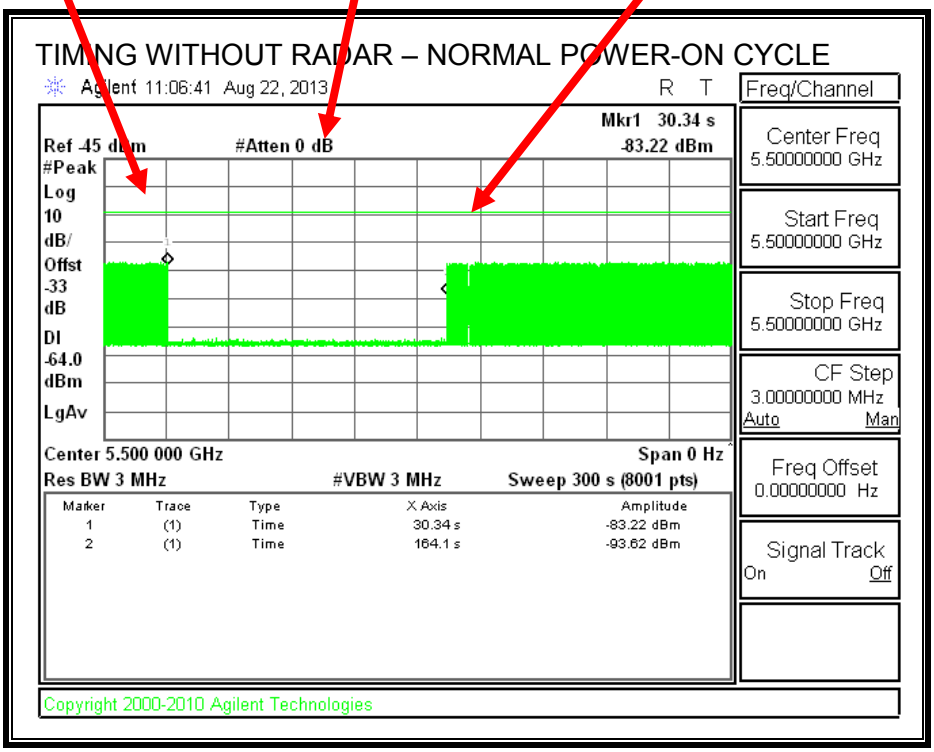
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT does not display any status	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT does not display any radar parameter values	No transmissions on channel
Within 54 to 60 second window	EUT does not display any radar parameter values	No transmissions on channel

TIMING WITHOUT RADAR DURING CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

End of CAC
Traffic is Initiated



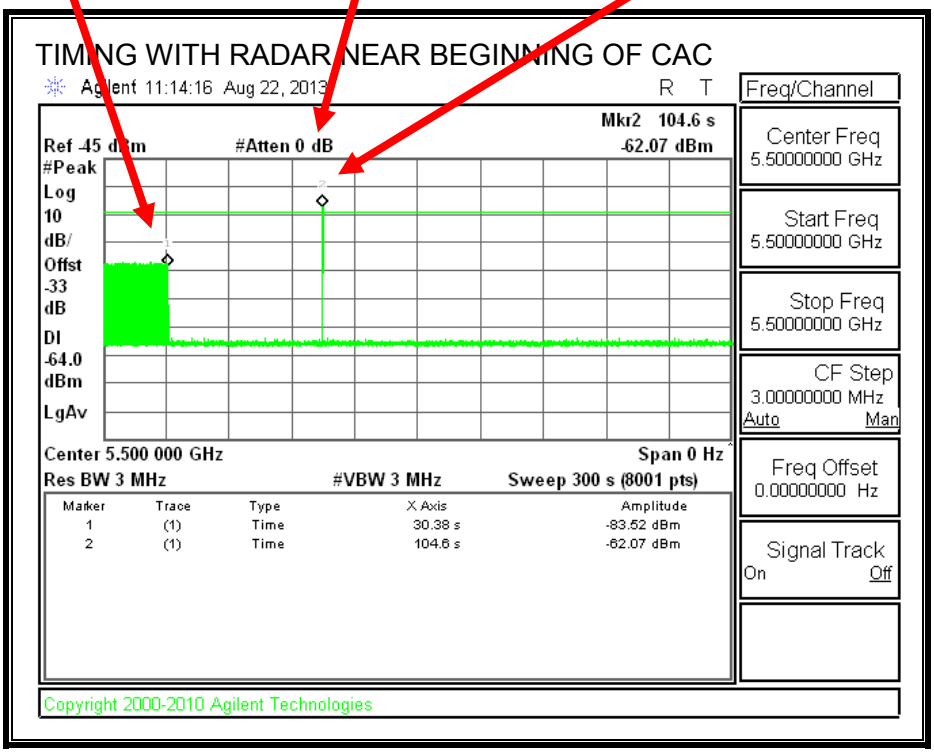
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

TIMING WITH RADAR NEAR BEGINNING OF CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



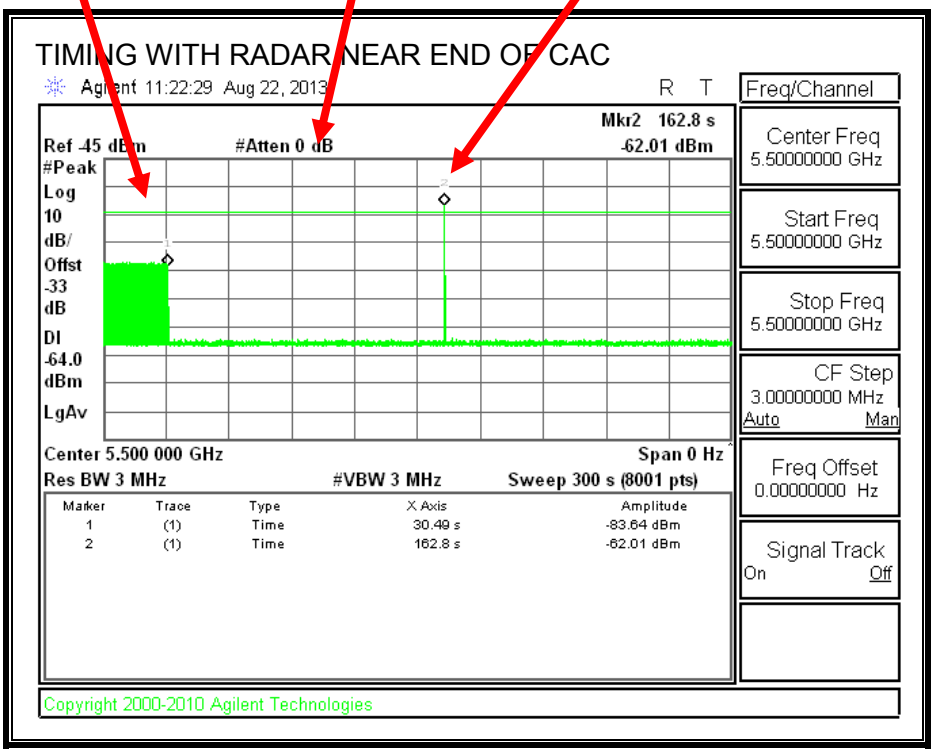
No EUT transmissions were observed after the radar signal.

TIMING WITH RADAR NEAR END OF CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

12.2.4. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

12.2.5. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

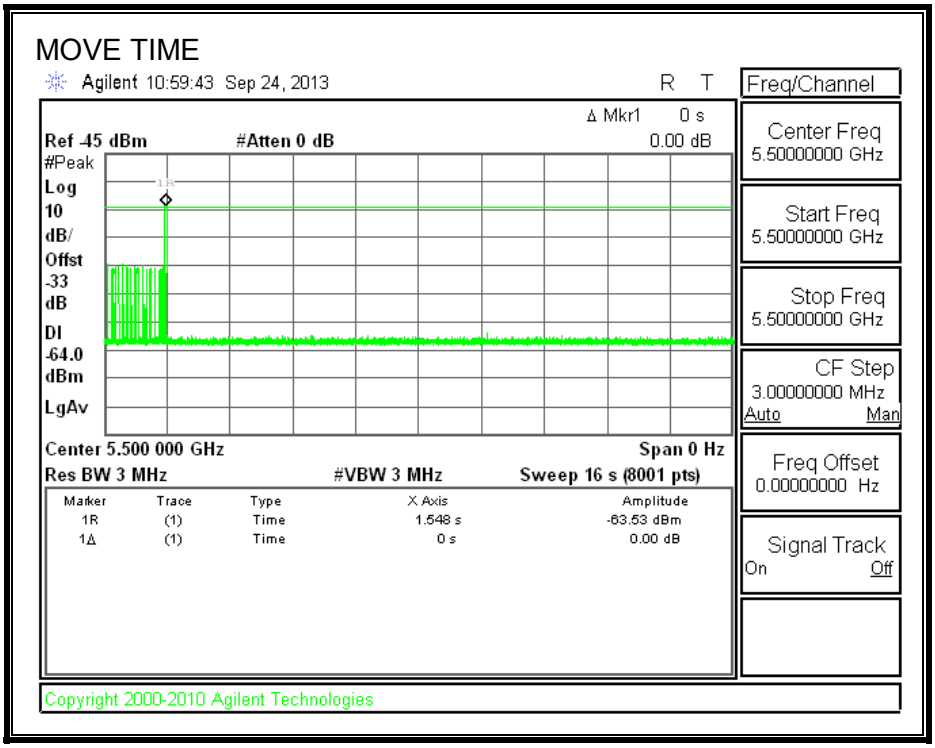
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

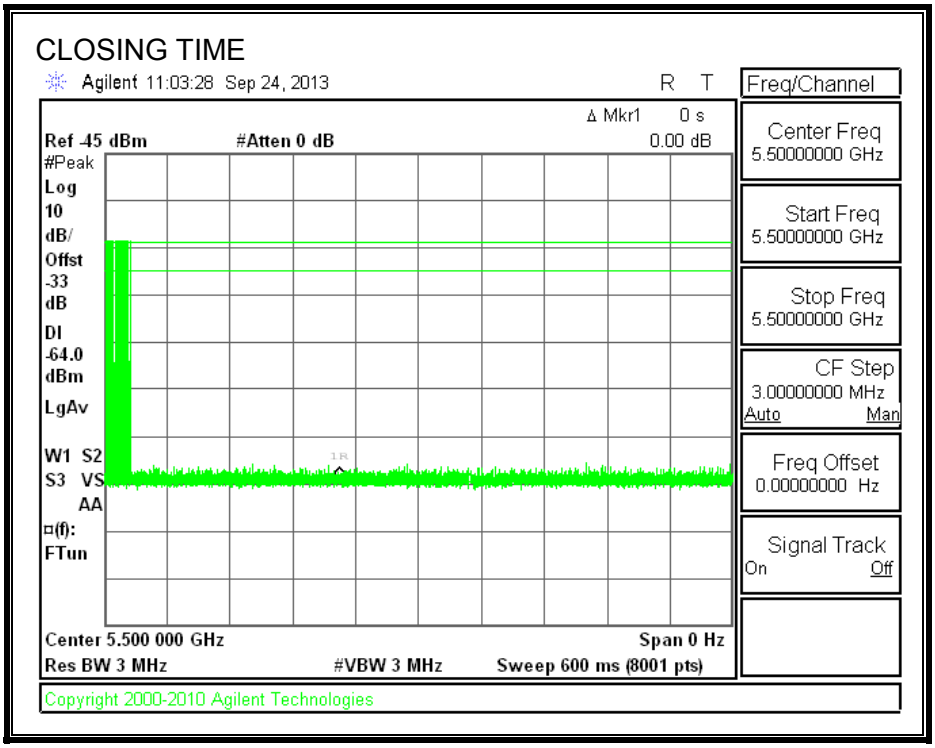
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.000	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	0.0	260

MOVE TIME



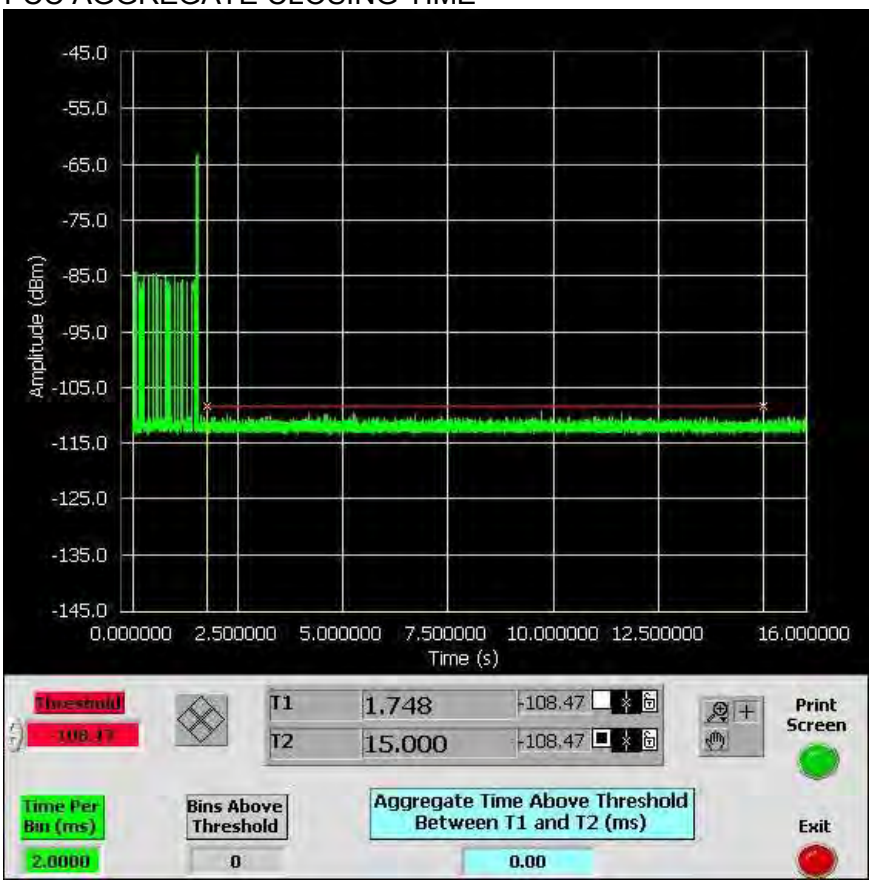
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

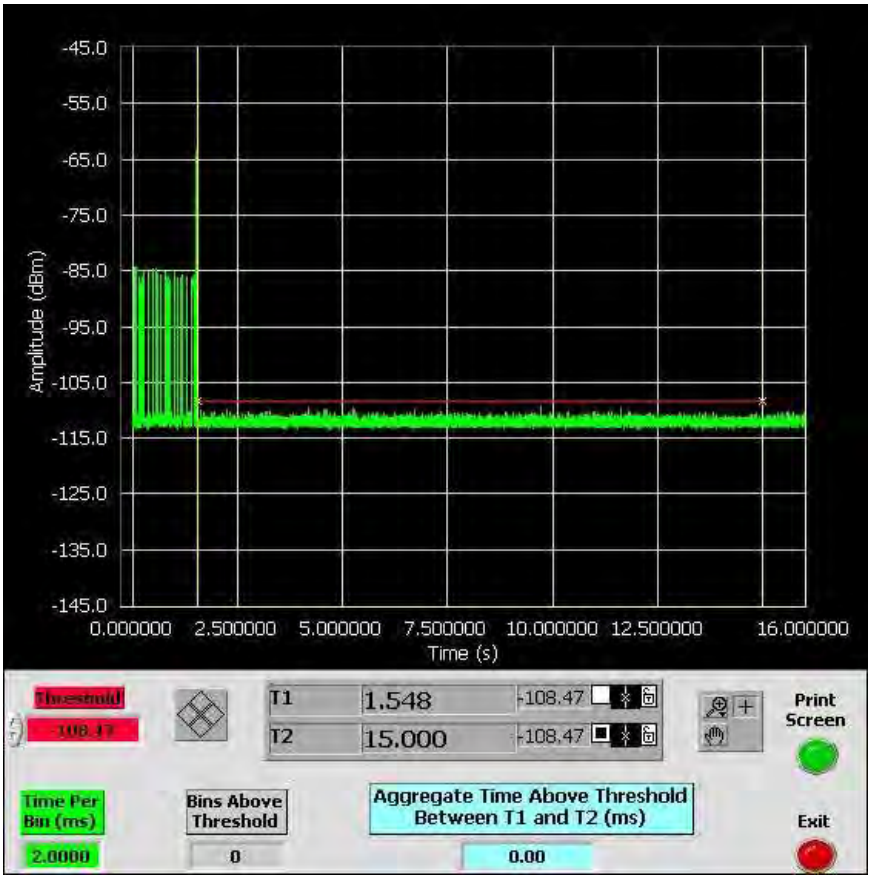
No transmissions are observed during the FCC aggregate monitoring period.

FCC AGGREGATE CLOSING TIME



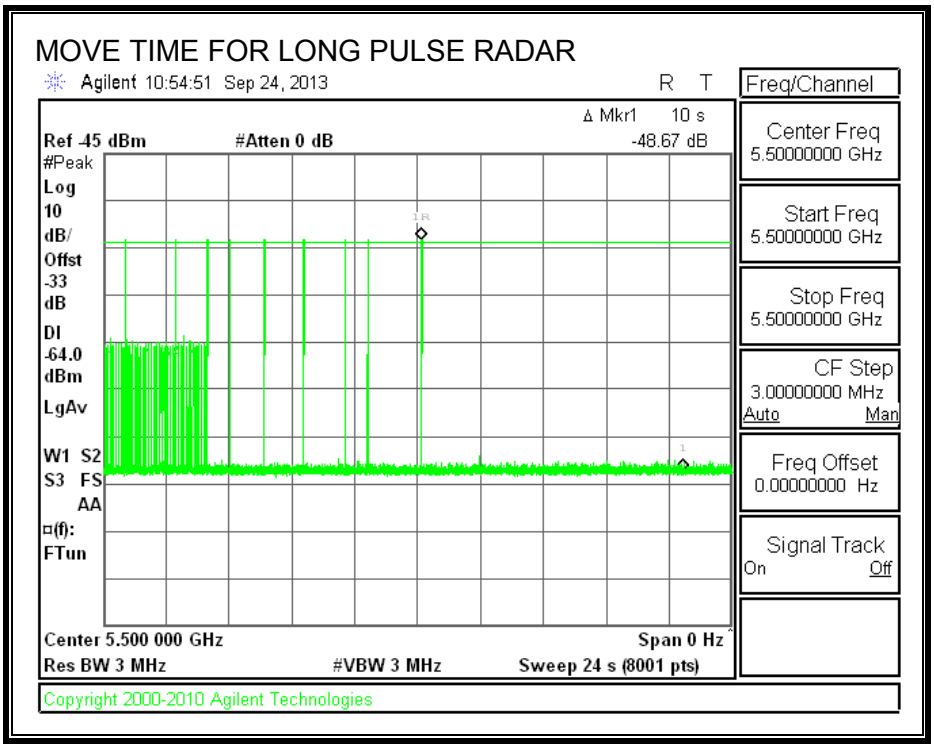
No transmissions are observed during the IC aggregate monitoring period.

IC AGGREGATE CLOSING TIME



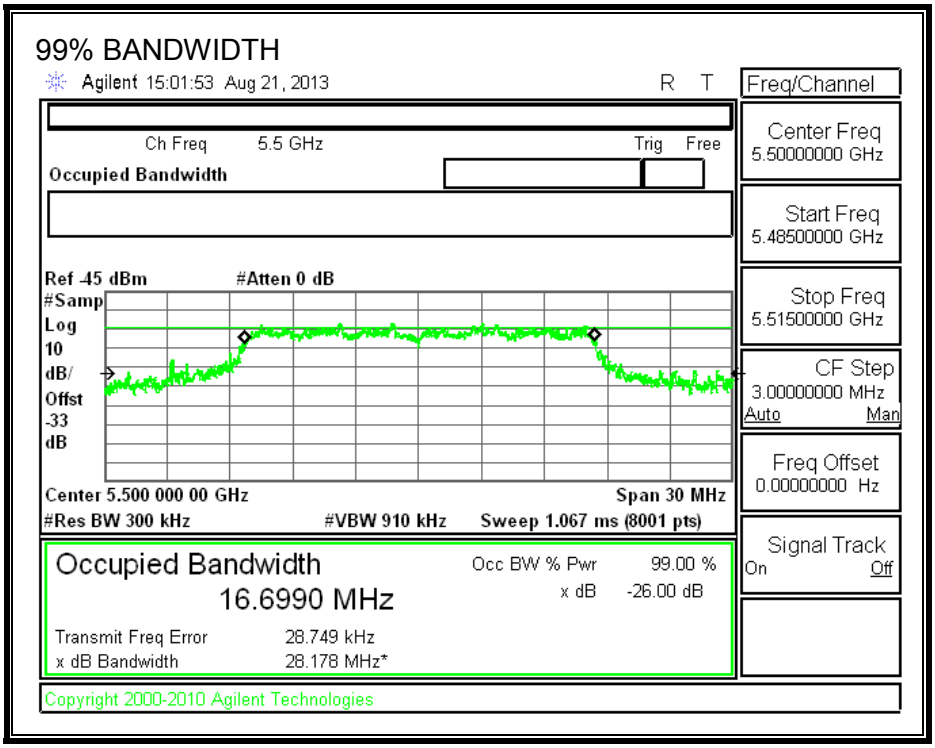
LONG PULSE CHANNEL MOVE TIME

The traffic ceases prior to 10 seconds after the end of the radar waveform.



12.2.6. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5492	5508	16	16.699	95.8	80

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 1 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5490	10	10	100	FL
5491	10	10	100	
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
5495	10	10	100	
5496	10	10	100	
5497	10	10	100	
5498	10	10	100	
5499	10	10	100	
5500	10	10	100	
5501	10	10	100	
5502	10	10	100	
5503	10	10	100	
5504	10	10	100	
5505	10	10	100	
5506	10	10	100	
5507	10	10	100	
5508	10	10	100	
5509	10	10	100	
5510	10	10	100	FH

12.2.7. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	86.67	60	Pass
FCC Short Pulse Type 2	30	90.00	60	Pass
FCC Short Pulse Type 3	30	96.67	60	Pass
FCC Short Pulse Type 4	30	80.00	60	Pass
Aggregate		88.33	80	Pass
FCC Long Pulse Type 5	30	100.00	80	Pass
FCC Hopping Type 6	42	95.24	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1	
1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	No
5	Yes
6	Yes
7	Yes
8	Yes
9	Yes
10	No
11	Yes
12	No
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	No
21	Yes
22	Yes
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

TYPE 2 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 2				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
2001	3.2	218.00	27	No
2002	1.2	216.00	29	Yes
2003	2.3	226.00	26	Yes
2004	1.2	213.00	26	Yes
2005	3.4	214.00	24	Yes
2006	2.3	208.00	27	Yes
2007	3.3	160.00	26	Yes
2008	3.1	192.00	29	Yes
2009	4.7	214.00	28	Yes
2010	2.1	154.00	23	Yes
2011	3.7	160.00	28	Yes
2012	1.8	230.00	28	Yes
2013	4.2	159.00	28	Yes
2014	3.7	186.00	28	Yes
2015	2.4	177.00	29	No
2016	4.9	200.00	26	Yes
2017	1.4	196.00	23	Yes
2018	5	185.00	24	Yes
2019	4.6	175.00	26	Yes
2020	3.7	209.00	27	Yes
2021	4.8	226.00	26	Yes
2022	1.9	172.00	25	Yes
2023	1.3	155.00	26	Yes
2024	4.1	154.00	28	Yes
2025	2.3	194.00	29	No
2026	1.1	209.00	25	Yes
2027	1.8	212.00	29	Yes
2028	4.7	192.00	24	Yes
2029	2	186.00	23	Yes
2030	1.8	167.00	23	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
3001	5.3	338.00	16	Yes
3002	8.4	425.00	17	Yes
3003	9.5	282.00	16	Yes
3004	7.7	312.00	16	Yes
3005	5.5	430.00	16	Yes
3006	9.4	467.00	18	Yes
3007	9.7	419.00	18	Yes
3008	6.4	304.00	16	Yes
3009	9.6	341.00	16	Yes
3010	7	327.00	16	Yes
3011	5.2	263.00	18	Yes
3012	8.7	401.00	16	Yes
3013	5.6	270.00	18	Yes
3014	7.1	451.00	16	Yes
3015	9.1	313.00	16	Yes
3016	7.7	319.00	16	No
3017	7.6	423.00	18	Yes
3018	7.4	301.00	16	Yes
3019	5.4	479.00	18	Yes
3020	8.5	366.00	17	Yes
3021	9.7	415.00	18	Yes
3022	7.1	260.00	16	Yes
3023	9.9	349.00	17	Yes
3024	6.7	268.00	17	Yes
3025	5.1	419.00	18	Yes
3026	9.8	268.00	17	Yes
3027	6.3	289.00	17	Yes
3028	6	278.00	18	Yes
3029	6	313	17	Yes
3030	8.3	268	17	Yes

TYPE 4DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 4				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
4001	16.5	291.00	14	Yes
4002	18.7	404.00	15	No
4003	16.5	282.00	13	Yes
4004	16.9	487.00	12	Yes
4005	14.4	259.00	15	Yes
4006	11.4	402.00	12	Yes
4007	15	278.00	15	Yes
4008	13.6	291.00	14	Yes
4009	16.6	495.00	12	Yes
4010	14.3	322.00	15	No
4011	12.3	330.00	12	Yes
4012	18.2	258.00	16	Yes
4013	16.3	371.00	14	Yes
4014	19.2	347.00	16	Yes
4015	16.8	491.00	12	Yes
4016	18.4	480.00	16	No
4017	13	298.00	15	Yes
4018	12.6	363.00	15	Yes
4019	16.2	362.00	14	Yes
4020	15.6	472.00	16	Yes
4021	15.9	299.00	16	No
4022	12.7	403.00	14	Yes
4023	18.7	433.00	15	No
4024	17.5	453.00	14	Yes
4025	19.2	295.00	16	Yes
4026	10.4	485.00	13	Yes
4027	12.6	497.00	15	No
4028	11.1	421.00	12	Yes
4029	14.7	316.00	14	Yes
4030	12	385.00	15	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	Yes
10	Yes
11	Yes
12	Yes
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

Note: The Type 5 randomized parameters are shown in a separate document.

TYPE 6 DETECTION PROBABILITY

Data Sheet for FCC Hopping Radar Type 6				
1 us Pulse Width, 333 us PRI, 9 Pulses per Burst, 1 Burst per Hop				
NTIA August 2005 Hopping Sequence				
Trial	Starting Index Within Sequence	Signal Generator Frequency (MHz)	Hops within Detection BW	Successful Detection (Yes/No)
1	107	5490	1	Yes
2	582	5491	6	Yes
3	1057	5492	4	Yes
4	1532	5493	2	Yes
5	2007	5494	4	Yes
6	2482	5495	6	Yes
7	2957	5496	6	Yes
8	3432	5497	2	Yes
9	3907	5498	3	Yes
10	4382	5499	4	Yes
11	4857	5500	7	Yes
12	5332	5501	4	Yes
13	5807	5502	4	Yes
14	6282	5503	6	Yes
15	6757	5504	5	Yes
16	7232	5505	1	No
17	7707	5506	5	Yes
18	8182	5507	5	Yes
19	8657	5508	2	Yes
20	9132	5509	5	Yes
21	9607	5510	7	Yes
22	10082	5490	4	No
23	10557	5491	4	Yes
24	11032	5492	8	Yes
25	11507	5493	5	Yes
26	11982	5494	10	Yes
27	12457	5495	5	Yes
28	12932	5496	8	Yes
29	13407	5497	8	Yes
30	13882	5498	2	Yes
31	14357	5499	5	Yes
32	14832	5500	3	Yes
33	15307	5501	3	Yes
34	15782	5502	4	Yes
35	16257	5503	5	Yes
36	17207	5504	4	Yes
37	17682	5505	5	Yes
38	18157	5506	6	Yes
39	18632	5507	5	Yes
40	19107	5508	5	Yes
41	19582	5509	2	Yes
42	20057	5510	6	Yes

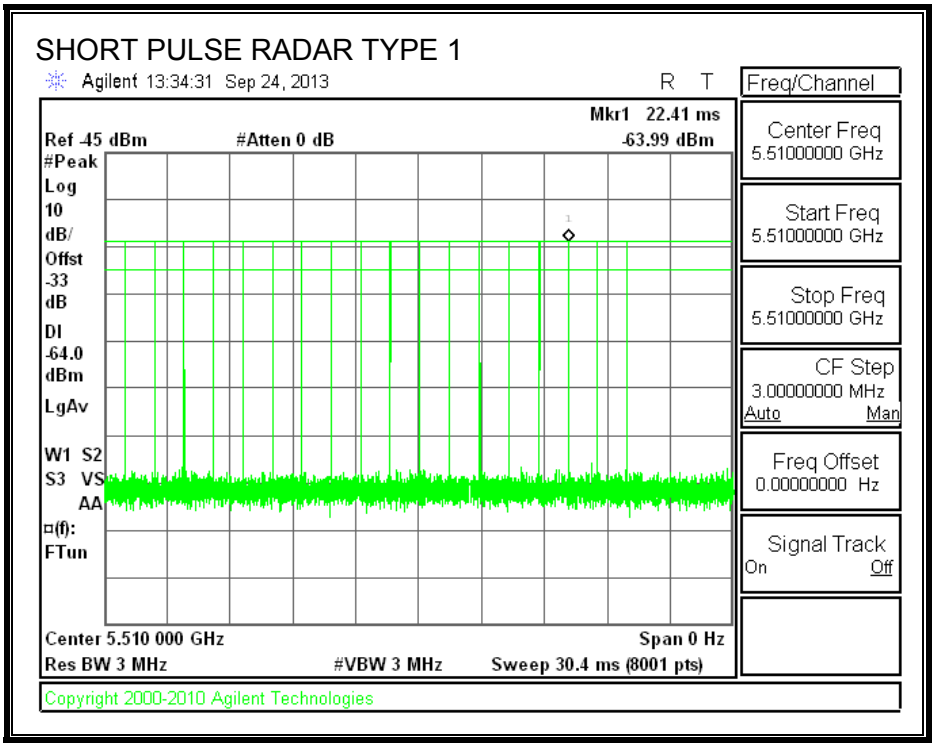
12.3. RESULTS FOR 40 MHz BANDWIDTH

12.3.1. TEST CHANNEL

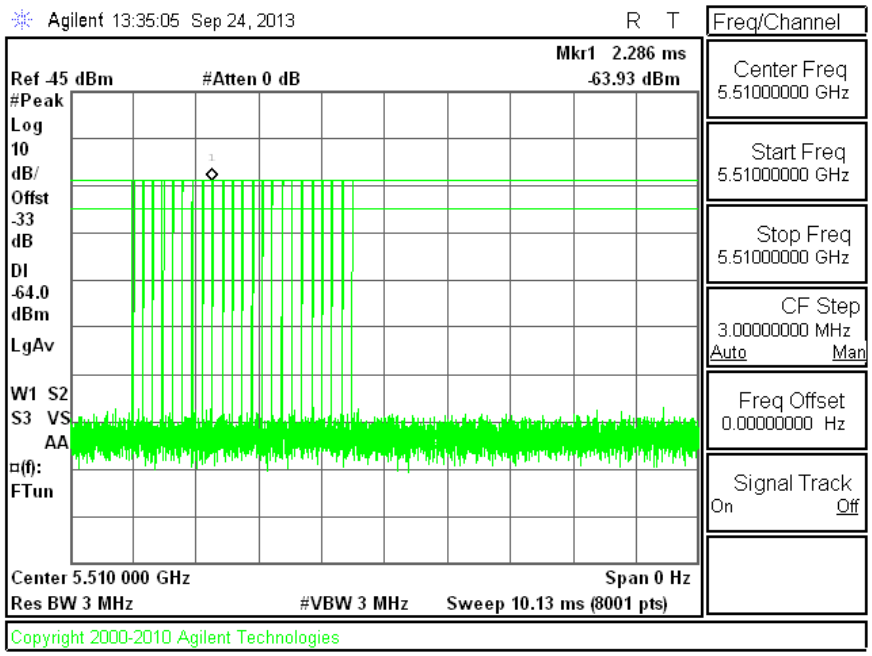
All tests were performed at a channel center frequency of 5510 MHz.

12.3.2. RADAR WAVEFORMS AND TRAFFIC

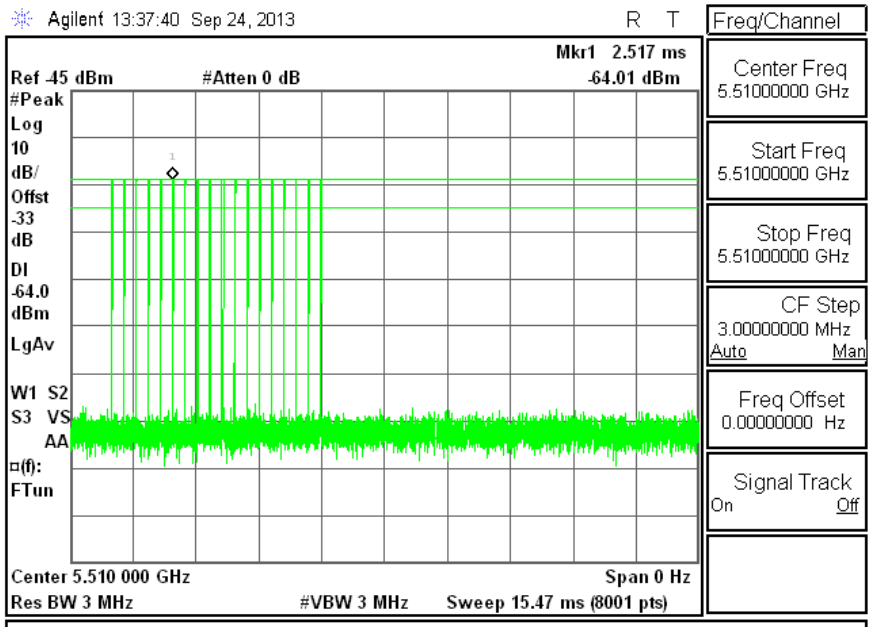
RADAR WAVEFORMS



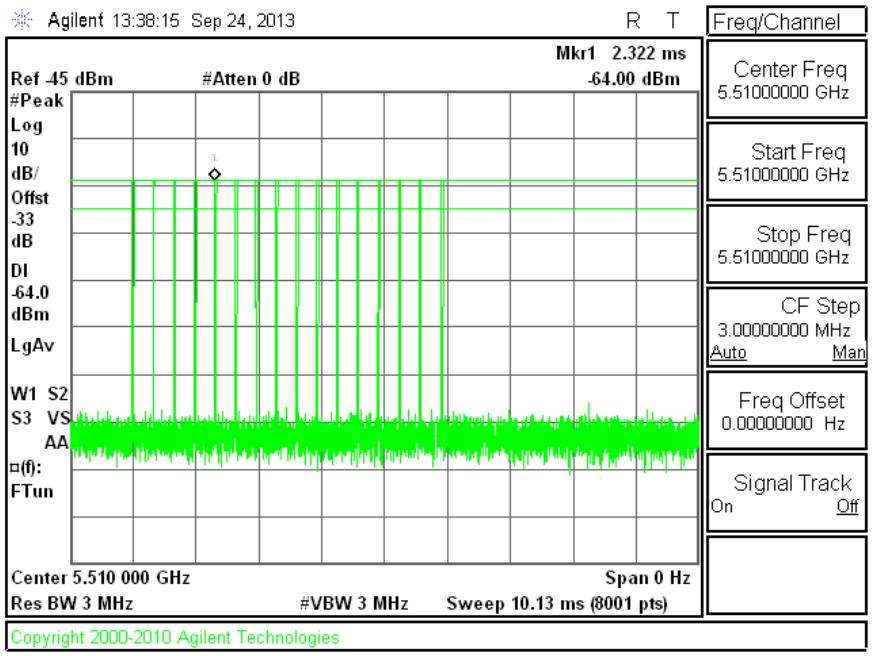
SAMPLE OF RADAR TYPE 2



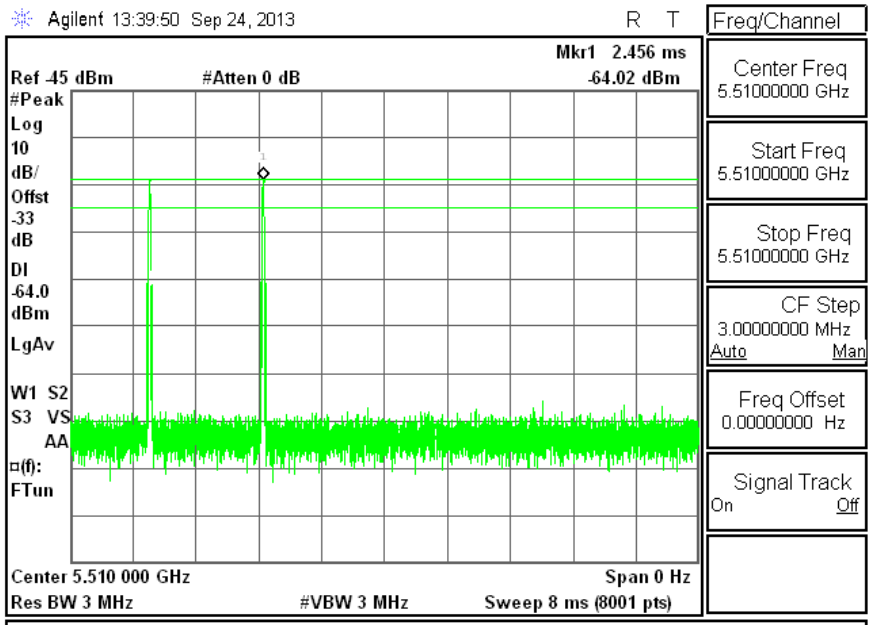
SAMPLE OF RADAR TYPE 3

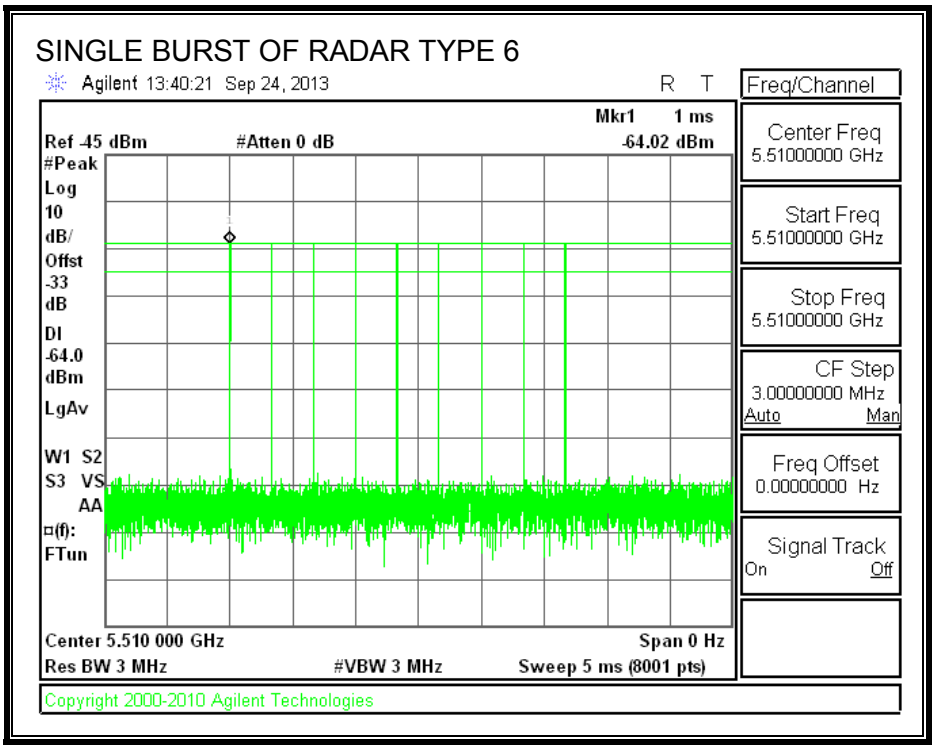


SAMPLE OF RADAR TYPE 4

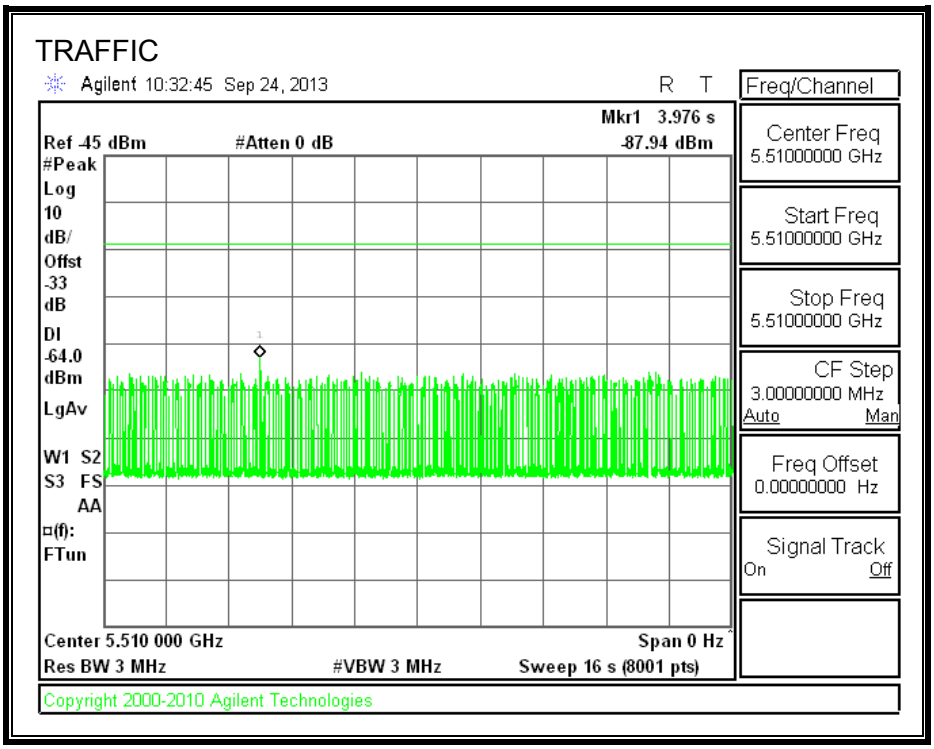


SAMPLE OF SINGLE BURST OF RADAR TYPE 5





TRAFFIC



12.3.3. CHANNEL AVAILABILITY CHECK TIME

PROCEDURE TO DETERMINE INITIAL POWER-UP CYCLE TIME

A link was established on channel then the EUT was rebooted. The time from the cessation of traffic to the re-initialization of traffic was measured as the time required for the EUT to complete the total power-up cycle. The time to complete the initial power-up period is 60 seconds less than this total power-up time.

PROCEDURE FOR TIMING OF RADAR BURST

With a link established on channel, the EUT was rebooted. A radar signal was triggered within 0 to 6 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

The Non-Occupancy list was cleared. With a link established on channel, the EUT was rebooted. A radar signal was triggered within 54 to 60 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

QUANTITATIVE RESULTS

No Radar Triggered

Timing of Reboot (sec)	Timing of Start of Traffic (sec)	Total Power-up Cycle Time (sec)	Initial Power-up Cycle Time (sec)
29.81	163.8	134.0	74.0

Radar Near Beginning of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.19	104.7	74.5	0.5

Radar Near End of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.04	162.6	132.6	58.6

QUALITATIVE RESULTS

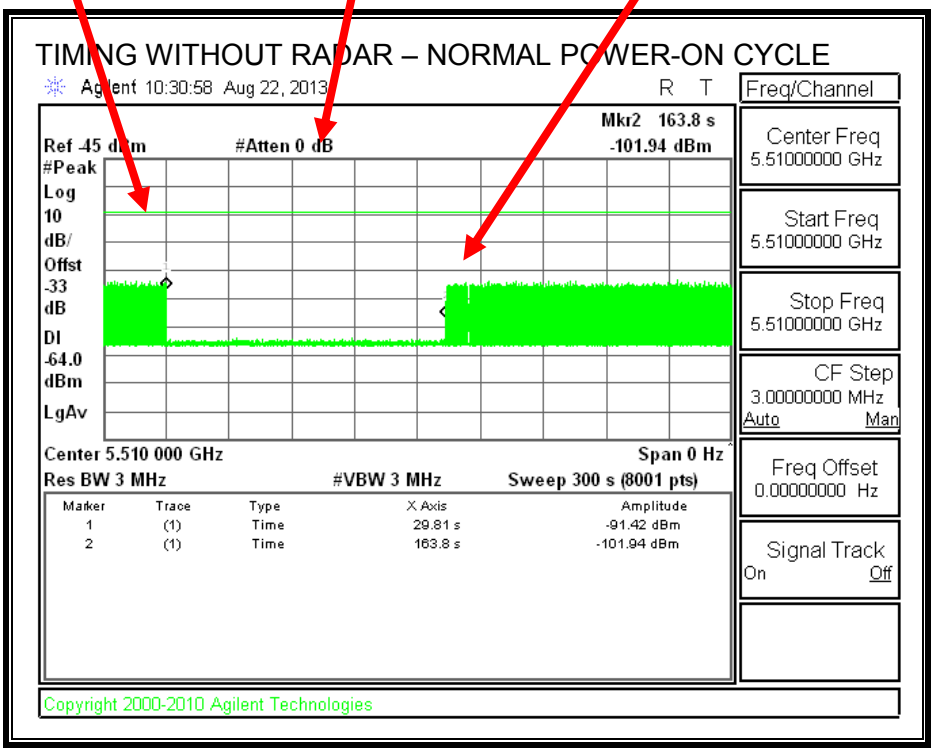
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT does not display any status	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT does not display any radar parameter values	No transmissions on channel
Within 54 to 60 second window	EUT does not display any radar parameter values	No transmissions on channel

TIMING WITHOUT RADAR DURING CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

End of CAC
Traffic is Initiated



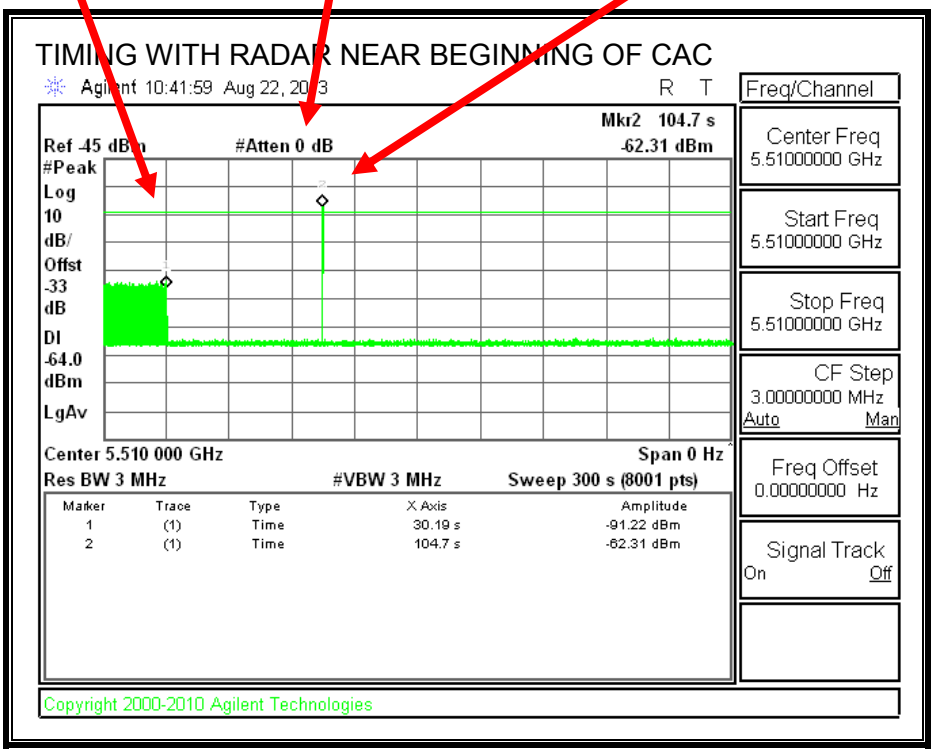
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

TIMING WITH RADAR NEAR BEGINNING OF CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



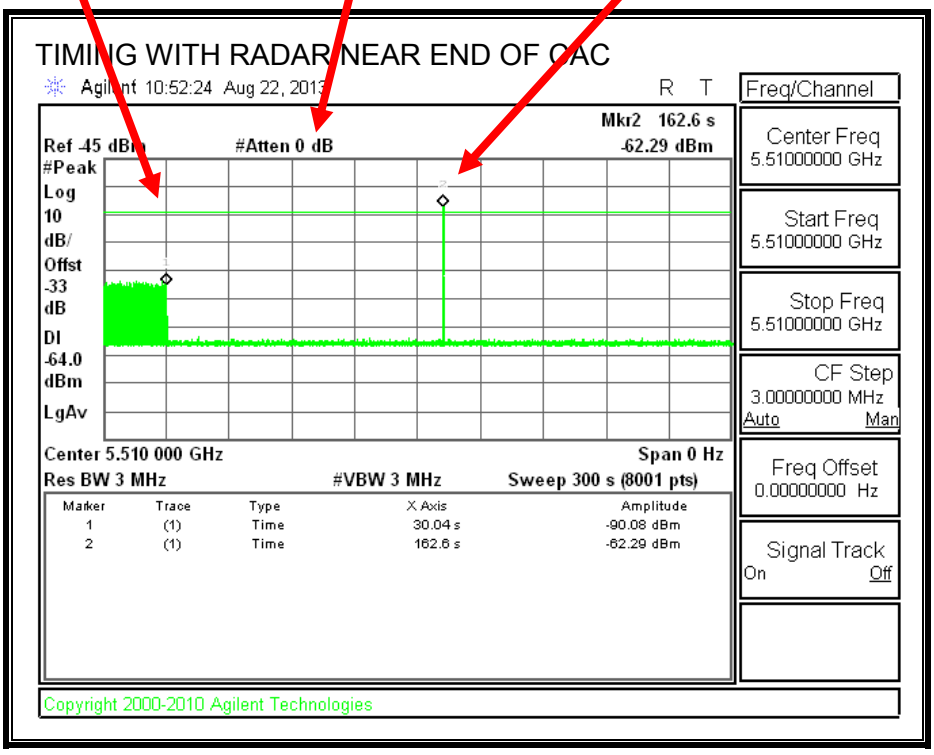
No EUT transmissions were observed after the radar signal.

TIMING WITH RADAR NEAR END OF CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

12.3.4. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

12.3.5. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

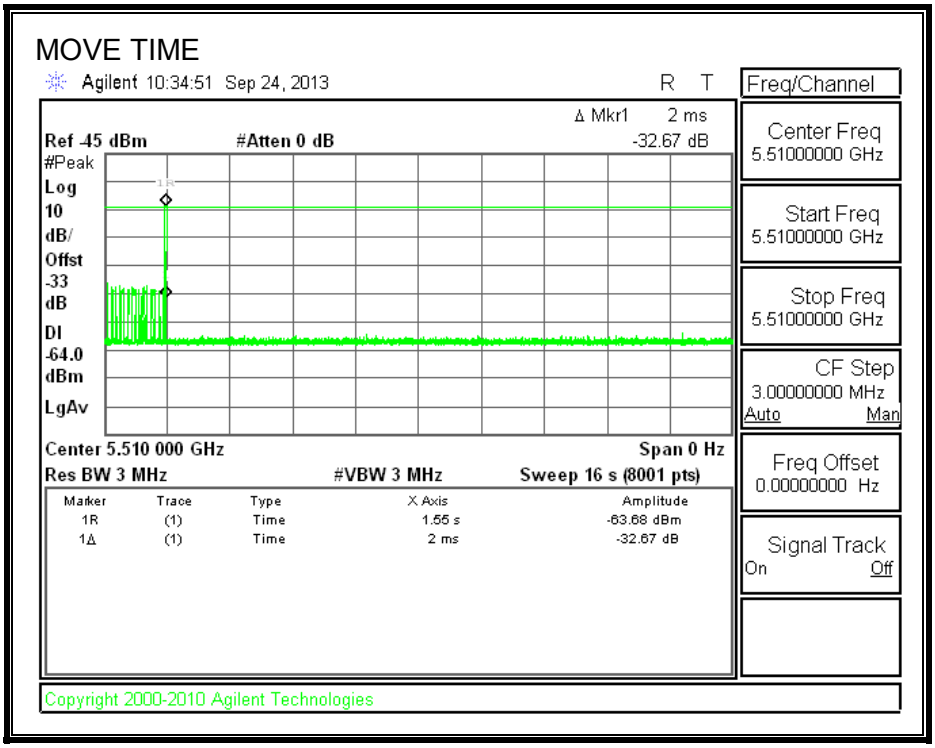
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

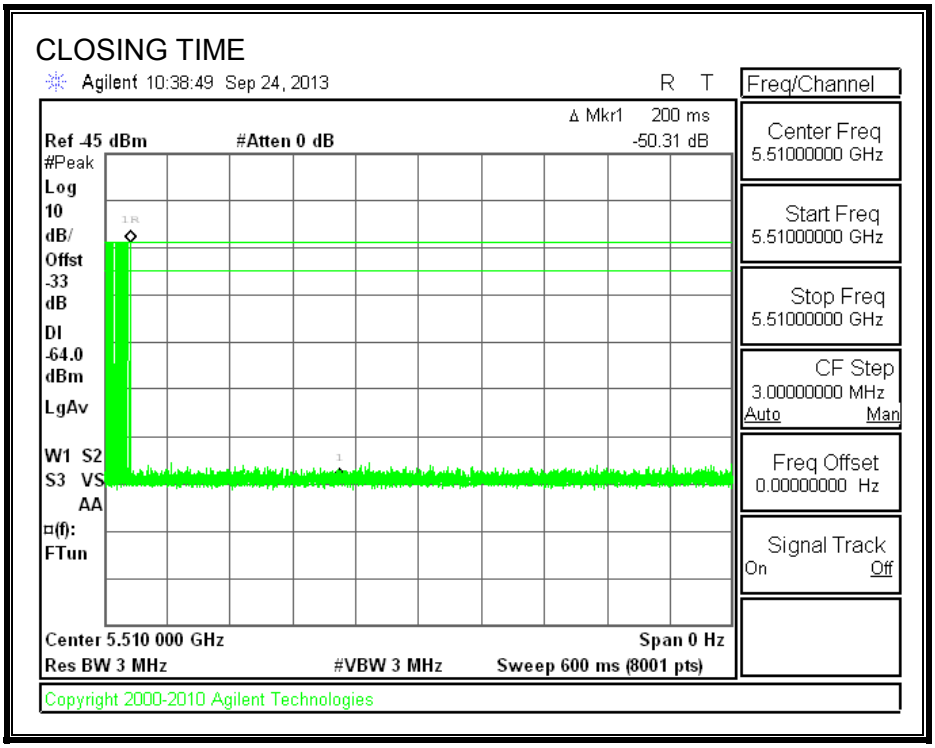
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.002	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	2.0	260

MOVE TIME



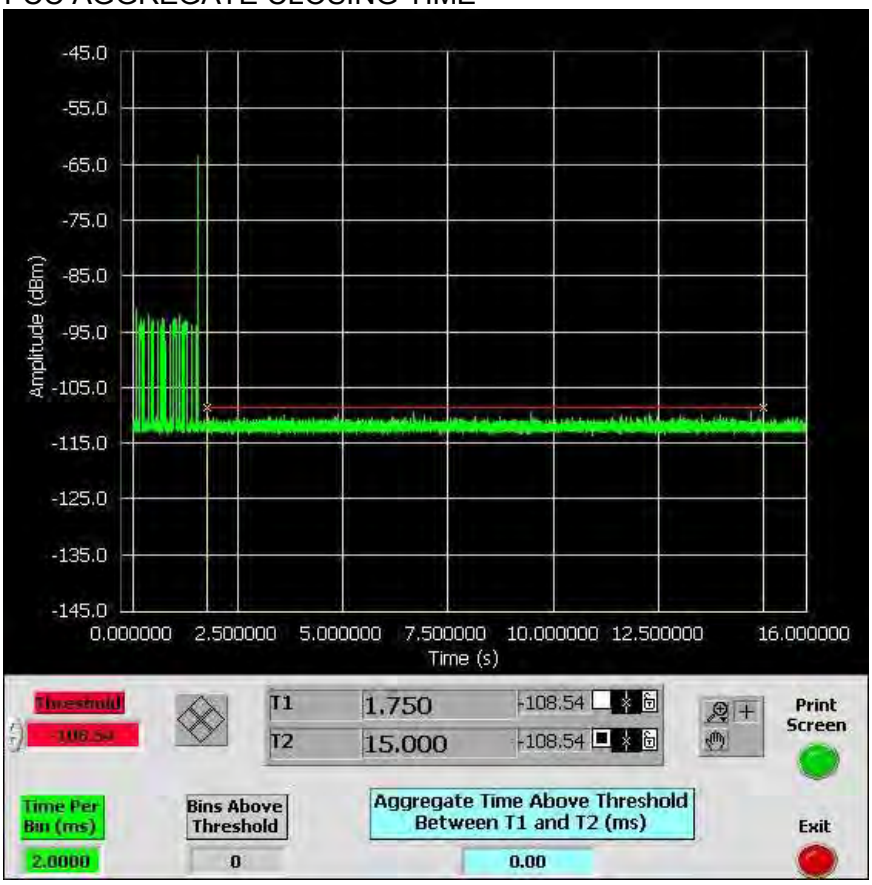
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

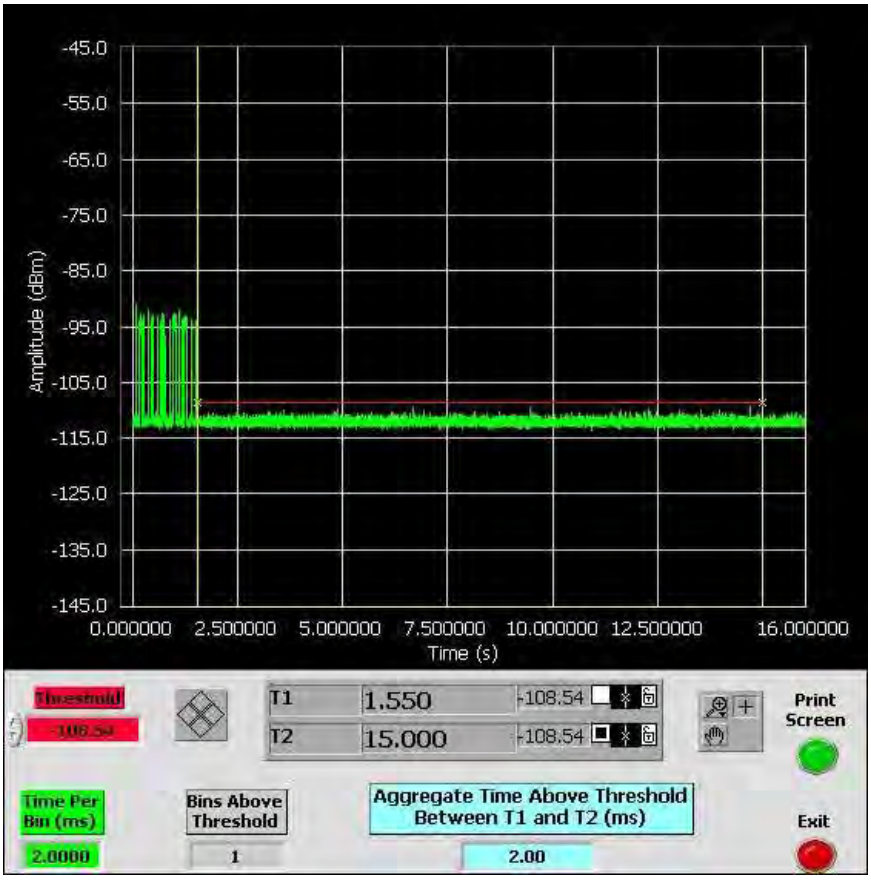
No intermittent transmissions are observed during the FCC aggregate monitoring period.

FCC AGGREGATE CLOSING TIME



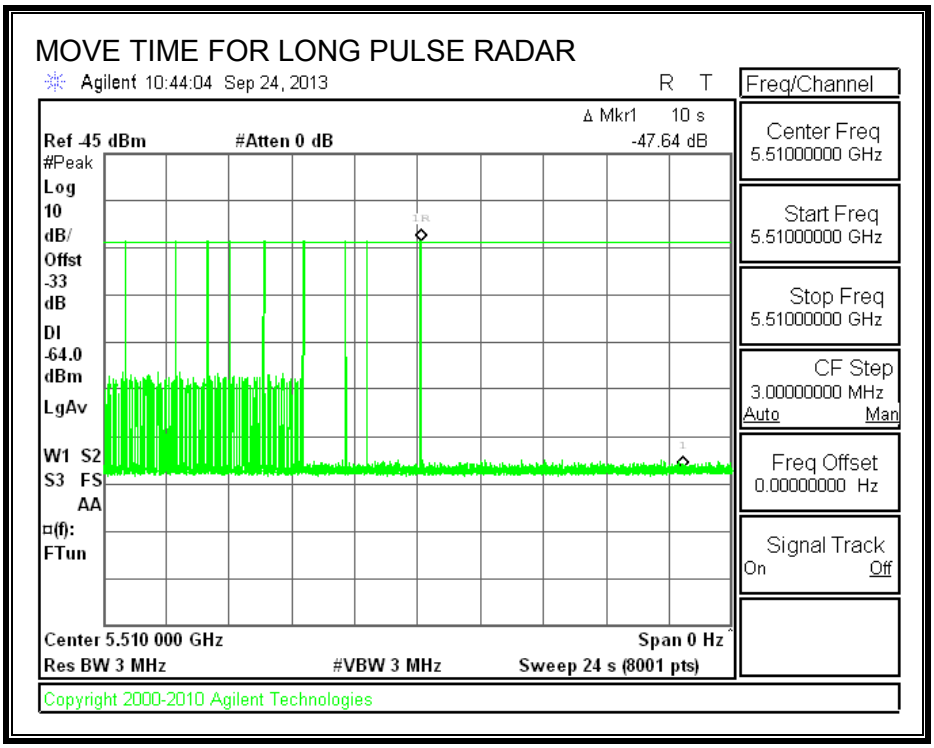
Only intermittent transmissions are observed during the IC aggregate monitoring period.

IC AGGREGATE CLOSING TIME



LONG PULSE CHANNEL MOVE TIME

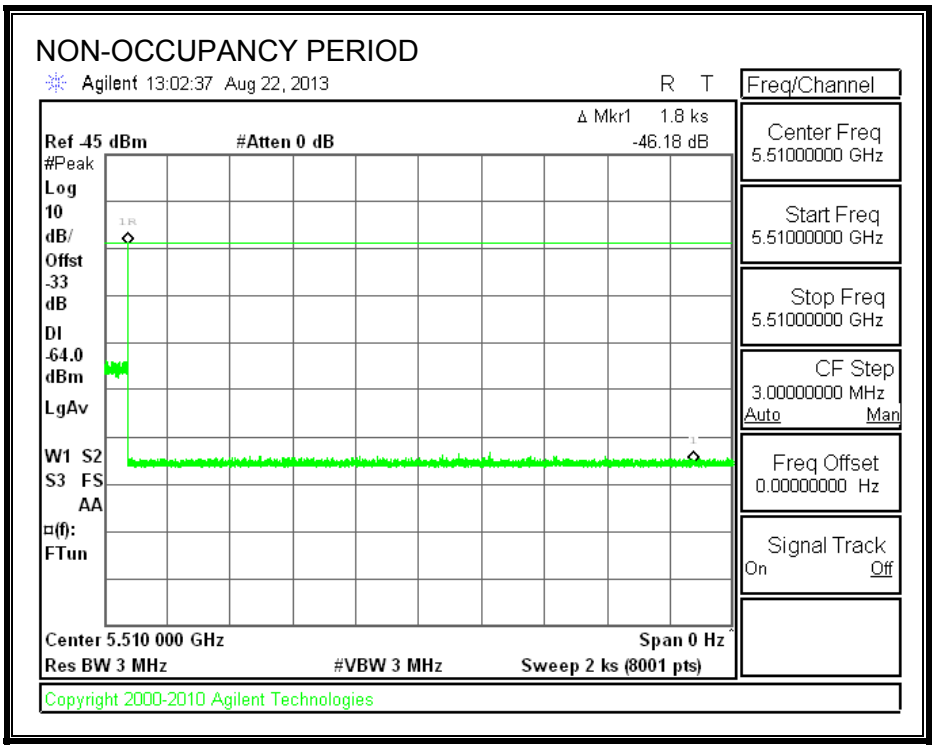
The traffic ceases prior to 10 seconds after the end of the radar waveform.



12.3.6. NON-OCCUPANCY PERIOD

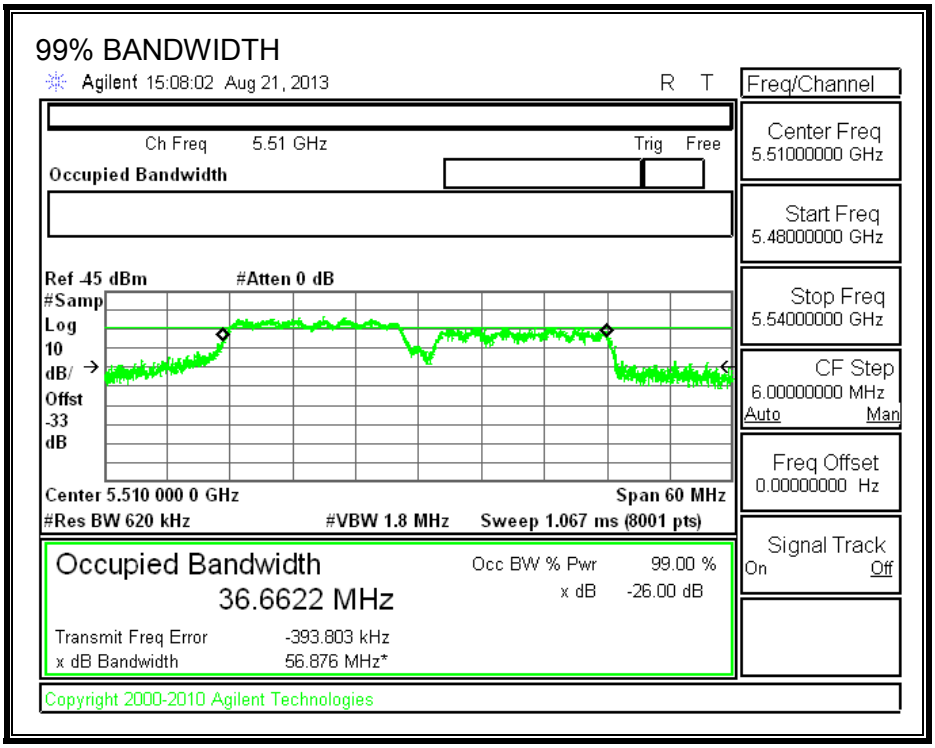
RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.



12.3.7. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5490	5530	40	36.662	109.1	80

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 1 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5490	10	10	100	FL
5491	10	10	100	
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
5495	10	10	100	
5496	10	10	100	
5497	10	10	100	
5498	10	10	100	
5499	10	10	100	
5500	10	10	100	
5501	10	10	100	
5502	10	10	100	
5503	10	10	100	
5504	10	10	100	
5505	10	10	100	
5506	10	10	100	
5507	10	10	100	
5508	10	10	100	
5509	10	10	100	
5510	10	10	100	
5511	10	10	100	
5512	10	10	100	
5513	10	10	100	
5514	10	10	100	
5515	10	10	100	
5516	10	10	100	
5517	10	10	100	
5518	10	10	100	
5519	10	10	100	
5520	10	10	100	
5521	10	10	100	
5522	10	10	100	
5523	10	10	100	
5524	10	10	100	
5525	10	10	100	
5526	10	10	100	
5527	10	10	100	
5528	10	10	100	
5529	10	10	100	
5530	10	10	100	FH

12.3.8. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	93.33	60	Pass
FCC Short Pulse Type 2	30	90.00	60	Pass
FCC Short Pulse Type 3	30	76.67	60	Pass
FCC Short Pulse Type 4	30	76.67	60	Pass
Aggregate		84.17	80	Pass
FCC Long Pulse Type 5	30	100.00	80	Pass
FCC Hopping Type 6	41	97.56	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	Yes
10	Yes
11	No
12	Yes
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	No
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

TYPE 2 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 2				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
2001	2.7	161.00	23	No
2002	3.9	198.00	29	Yes
2003	4.7	164.00	29	Yes
2004	5	175.00	25	Yes
2005	3.2	154.00	28	Yes
2006	1.4	208.00	25	Yes
2007	2.5	178.00	29	Yes
2008	2.5	155.00	25	Yes
2009	1.6	190.00	28	Yes
2010	3.4	174.00	24	No
2011	2.6	175.00	23	Yes
2012	3.8	209.00	27	Yes
2013	2.6	186.00	26	Yes
2014	3.2	182.00	27	Yes
2015	2	213.00	28	Yes
2016	2.6	209.00	23	Yes
2017	1.9	165.00	28	Yes
2018	4.2	191.00	27	Yes
2019	4.8	183.00	23	Yes
2020	4.2	167.00	27	Yes
2021	3.5	176.00	26	Yes
2022	1.3	180.00	27	Yes
2023	3.8	156.00	27	Yes
2024	3.4	174.00	25	Yes
2025	2.4	201.00	24	Yes
2026	4	158.00	26	Yes
2027	2.6	185.00	26	Yes
2028	4.3	225.00	25	No
2029	2.4	192.00	25	Yes
2030	2.3	218.00	26	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
3001	5.7	304.00	18	Yes
3002	5.3	391.00	18	Yes
3003	9.4	321.00	17	No
3004	8.4	252.00	16	Yes
3005	7.4	257.00	16	Yes
3006	9.5	348.00	16	Yes
3007	9.8	336.00	17	Yes
3008	7.4	374.00	17	Yes
3009	9.6	373.00	17	No
3010	9.9	311.00	16	No
3011	9.8	435.00	18	No
3012	9.9	291.00	18	Yes
3013	9.4	346.00	17	Yes
3014	6.3	303.00	16	Yes
3015	7.7	303.00	18	Yes
3016	8.7	436.00	16	Yes
3017	7.1	437.00	16	Yes
3018	7.3	380.00	16	No
3019	6.8	385.00	17	Yes
3020	8.9	295.00	16	Yes
3021	9.6	394.00	17	Yes
3022	9.1	489.00	17	No
3023	9.3	467.00	18	Yes
3024	8.9	464.00	16	Yes
3025	5.8	376.00	16	Yes
3026	5.1	464.00	17	Yes
3027	6.5	482.00	17	Yes
3028	8.2	500.00	17	No
3029	6.3	476	16	Yes
3030	5.9	252	16	Yes

TYPE 4 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 4				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
4001	18.8	331.00	16	No
4002	18.8	305.00	15	Yes
4003	17.5	499.00	16	Yes
4004	16.5	260.00	12	Yes
4005	16	487.00	14	No
4006	12	292.00	14	Yes
4007	11.1	463.00	13	Yes
4008	14.7	372.00	12	No
4009	15.9	478.00	14	Yes
4010	12.4	495.00	13	No
4011	13	427.00	16	Yes
4012	17.6	338.00	13	No
4013	15.2	479.00	14	Yes
4014	13.2	288.00	15	Yes
4015	13.4	370.00	12	Yes
4016	15.7	438.00	16	Yes
4017	13.9	329.00	13	Yes
4018	16.3	391.00	13	Yes
4019	12.2	474.00	16	Yes
4020	13.6	252.00	13	Yes
4021	12.7	470.00	13	Yes
4022	18.6	250.00	12	Yes
4023	18.6	325.00	13	Yes
4024	16.2	482.00	12	No
4025	16.4	310.00	13	No
4026	14.8	468.00	15	Yes
4027	13.9	444.00	14	Yes
4028	18.4	480.00	13	Yes
4029	11.8	290.00	14	Yes
4030	16.8	397.00	16	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	Yes
10	Yes
11	Yes
12	Yes
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

Note: The Type 5 randomized parameters are shown in a separate document.

TYPE 6 DETECTION PROBABILITY

Data Sheet for FCC Hopping Radar Type 6				
1 us Pulse Width, 333 us PRI, 9 Pulses per Burst, 1 Burst per Hop				
NTIA August 2005 Hopping Sequence				
Trial	Starting Index Within Sequence	Signal Generator Frequency (MHz)	Hops within Detection BW	Successful Detection (Yes/No)
1	69	5490	11	No
2	544	5491	8	Yes
3	1019	5492	7	Yes
4	1494	5493	10	Yes
5	1969	5494	13	Yes
6	2444	5495	10	Yes
7	2919	5496	10	Yes
8	3394	5497	7	Yes
9	3869	5498	9	Yes
10	4344	5499	8	Yes
11	4819	5500	9	Yes
12	5294	5501	9	Yes
13	5769	5502	11	Yes
14	6244	5503	10	Yes
15	6719	5504	7	Yes
16	7194	5505	9	Yes
17	7669	5506	7	Yes
18	8144	5507	9	Yes
19	8619	5508	7	Yes
20	9094	5509	12	Yes
21	9569	5510	8	Yes
22	10044	5511	8	Yes
23	10519	5512	5	Yes
24	10994	5513	6	Yes
25	11469	5514	10	Yes
26	11944	5515	13	Yes
27	12419	5516	9	Yes
28	12894	5517	10	Yes
29	13369	5518	15	Yes
30	13844	5519	6	Yes
31	14319	5520	11	Yes
32	14794	5521	6	Yes
33	15269	5522	12	Yes
34	15744	5523	7	Yes
35	16219	5524	9	Yes
36	16694	5525	8	Yes
37	17169	5526	6	Yes
38	17644	5527	11	Yes
39	18119	5528	10	Yes
40	18594	5529	10	Yes
41	19069	5530	7	Yes

TYPE 6 DETECTION PROBABILITY (CONT.)

20	9062	5509	11	Yes
21	9537	5510	11	No
22	10012	5511	10	Yes
23	10487	5512	8	Yes
24	10962	5513	8	Yes
25	11437	5514	9	Yes
26	11912	5515	8	Yes
27	12387	5516	8	Yes
28	12862	5517	10	Yes
29	13337	5518	14	Yes
30	13812	5519	6	Yes
31	14287	5520	9	Yes
32	14762	5521	6	Yes
33	15237	5522	10	Yes
34	15712	5523	9	Yes
35	16187	5524	10	Yes
36	16662	5525	7	Yes
37	17137	5526	11	Yes
38	17612	5527	13	Yes
39	18087	5528	8	Yes
40	18562	5529	7	Yes
41	19037	5530	4	Yes